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Commission of Conservation

CANADA

HON. CLIFFORD SIFTON, Chairman
JAMES WHITE, Secretary

1911

Lands
Fisheries and Game
Minerals

Ottawa: The Mortimer Co., Ltd. : 1911

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To His Excellency the Right Honourable Sir Albert Henry George, Earl Grey, G.C.M.G., &c., &c., Governor General of Canada

May it Please Your Excellency:

The undersigned has the honour to lay before Your Excellency the report of the Commission of Conservation on "Lands, Fisheries and Game, and Minerals," for the year 1911.

Respectfully submitted

CLIFFORD SIFTON
Chairman

Ottawa, June 29, 1911

226783

OTTAWA, June 28, 1911

Sir:

I have the honour to transmit herewith the report of the Commission of Conservation on "Lands, Fisheries and Game, and Minerals" for 1911. A great deal of research work was involved in the preparation of this volume and the Commission gratefully acknowledges the assistance kindly given by the Dominion and Provincial Departments of Agriculture, Fisheries, and Mines. The Agricultural Colleges throughout Canada gave valuable assistance in connection with the agricultural survey, and many thanks are due to Hon. W. J. Bowser, Attorney-General of British Columbia, whose Department contributed able articles on the fisheries and game of that Province. The Commission also desires to express its appreciation of the kindness of Messrs. E. T. Carbonell, C. W. Gauthier, E. T. D. Chambers and others, in supplying contributions respecting fisheries and game.

I have the honour to be,

Sir,

Your obedient servant

JAMES WHITE

Secretary

HON. CLIFFORD SIFTON,
Chairman,
Commission of Conservation,
Ottawa.

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LANDS

An Ontario Farm Scene

AGRICULTURAL SURVEY, 1910

A beginning was made in 1910 on the work outlined in the first report of the Lands Committee of the Commission of Conservation.[a] An effort was made to find out the state of agriculture in Canada by means of an agricultural survey of representative areas in each province. The inquiry was carried out under the supervision of the officers of the Provincial Departments of Agriculture and the Agricultural Colleges. In every province except Ontario, in which the survey was made by the representatives of the Seed Branch of the Department of Agriculture, special men were employed to visit one hundred or more representative farms. The information thus obtained was entered upon printed forms and has since been tabulated. The results are considered fairly representative of the actual conditions in each province in regard to the preservation of soil fertility, the inroads of weeds and insect pests, and the practice of well-planned farming as shown by systematic rotation of crops, the practice of sowing selected seeds and the application of manures or other fertilizers.

The following is a summary of the reports received from the field men who did the survey work in 1910. The facts and figures are taken from the condensed summaries of the sheets filled in by them, and from the general summaries and notes handed in with their complete reports.

Prince Edward Island

Of the area visited in this province seventy-four per cent. was under field crops, three per cent. in unbroken pasture and twenty-two per cent. in woods.

Rotation of Crops

Over ninety per cent. of the farmers claim to be following a systematic rotation of crops; but it can not be called systematic when the course extends over an indefinite period of from seven to ten years, with hay and pasture extending over five or six years of the course. Only three per cent. follow a rotation as short as four years. The fact that red clover, alsike and timothy to a large extent make up the pasture mixtures, results in scant pasturage after the first two years and the increase of noxious weeds. Those farmers who have adopted shorter rotations are very enthusiastic over the results. They report fewer weeds, increased fertility from use of clover and a higher crop production from the farms.

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a See First Annual Report of the Commission of Conservation, 1910, page 191.

Seed Selection

Only two per cent. use hand selected seed, while ninety-eight per cent. use seed either exchanged or purchased and graded with the fanning mill. Every year thousands of dollars have been spent in buying imported seed grain, grass, root and vegetable seed. Very few farmers are growing seed under their own conditions of soil and climate or trying to improve it on their own farms. The few who are doing so claim excellent results, and thanks to the Canadian Seed Growers' Association, some others are now beginning to hand select and grow their own seed.

Manures and Fertilizers

One hundred per cent. use manure at the rate of from thirty to fifty cart loads per acre on roots and potatoes. Thirty per cent. use artificial fertilizers on roots and potatoes. Very diverse are the opinions as to their value, many having given them up as unprofitable. In many cases the farmer invests without understanding the first principles of the use of chemical fertilizers. There is a great need for more knowledge in the care of barnyard manure, as many have their manure piles under the eaves on sloping ground, thus allowing the very essence to flow away and be lost.

Weeds

There were twenty-eight varieties of weeds reported and many complaints were made of impurities in purchased grass and clover seeds. The consensus of opinion is that more rigid inspection should be enforced; but if farmers were better trained in inspecting the seed, and were able to identify weed seeds and harmful weeds, they would refuse to buy impure seed.

Insect Pests and Plant Diseases

Every farmer visited reported trouble with the potato beetle, the loss ranging from five to ten per cent. of the crop; but in most cases it was kept low by the use of Paris green. Over fifty per cent. reported smut on oats with a loss of from five to ten per cent. Forty per cent. reported rust on grains with slight loss. About forty per cent. reported ten to fifteen per cent. loss from potato rot, which was perhaps the most serious of the diseases reported. A number reported loss of from twenty to thirty per cent. from club root on turnips. There is a great lack of knowledge concerning these foes, consequently the total loss is large. Many have not the slightest conception of the amount of damage done by insect pests and plant diseases. There is a great need of more scientific knowledge being disseminated among the farmers regarding methods of combatting these enemies.

Water Supply

Ninety-seven per cent. obtain water from wells. All carry the water by hand. A number of wells were too near sources of contamination and were very poorly protected from surface

drainage. Others, in barns, were too near the seepage from the stables to be considered pure.

Fuel

About sixty per cent. use wood for fuel, six per cent. use coal and thirty-four per cent. wood and coal. Seventy-two per cent. have wood lots on their farms; sixteen per cent. have a perpetual supply of fuel; while the others estimate that the supply will last at the present rate of consumption, for twenty years. Very little, if any, attention has been given to the principles of forestry and many are now beginning to view with some concern the lessening wood supply. Forest fires have done considerable damage in the past. There is need here for information and encouragement among the farmers to assist them in conserving what is left and in adopting principles of reforestation which will insure a future supply.

Typhoid

No typhoid fever was reported on any of the farms within the last ten years.

Stock

Great interest is taken in the production of the famous Island horses; but too little attention is given to the laws of breeding. Some seem to think they should sell their best mares and keep the inferior ones for breeding purposes. If more attention were given to this particular, fewer misfits would be in evidence. The dairy industry has been the salvation of the agriculture of Prince Edward Island. There is still great room for improvement. There is a lack of individual testing, and the mixing of breeds is too frequent. Sheep are likely to increase in numbers in the future as they are very much appreciated as weed destroyers and the present high prices are attracting attention.

Considerable intelligence is displayed in the breeding and care of hogs; but many have given up winter feeding owing to bad results from rheumatism and the hogs going off their feet. The importance of dry beds, ventilation and proper foods, are being more fully recognized in the winter management.

Grain

Oats, wheat and barley are the principal grain crops grown. Many sow too much seed per acre for good results, which makes it difficult to obtain a stand of grass or clover. Joint worm has played great havoc with wheat growing in many districts and has led to the discontinuing of that crop in some sections. The old two-rowed varieties of barley are grown almost entirely, with the result that lower yields are obtained than would be the case if some of our best six-rowed varieties were sown. The farmers of Prince Edward Island say "We want some capable person to visit us on our farms that he may study our conditions and then be in a position to advise us. Better still, we want some one to practise the best methods right here in our own locality. Illustration farms are what we must have for our most rapid advancement."

Nova Scotia

Of the area visited, thirty-one per cent. was in field crops, twenty-eight per cent. in unbroken pasture and forty-one per cent. in woods.

Rotation of Crops

Sixty-two per cent. follow no systematic rotation of crops, nineteen per cent. practise a fairly good four or five year rotation. The balance of the farmers visited follow what they consider to be a rotation; but hay entering into the course for so many years, it can scarcely be termed such. Hay in many instances runs on indefinitely until it yields such a light crop that it does not pay to keep the land in grass any longer. Then it is plowed, sowed to grain and re-seeded. Clover is not often enough used in the rotation to be of very much value in supplying root fibre and nitrogen to the soil.

Seed Selection

Ninety-five per cent. do no seed selecting whatever. Three per cent. hand pick a little wheat; but this seems to be about the only crop which receives any attention. Two per cent. report the use of fanning mill on their own seed grain. The majority of the farmers buy their seed. This is not because a good quality of seed grain cannot be grown in Nova Scotia; but largely on account of the farmers having fallen into the habit of buying it, in order to save themselves the trouble of selecting and cleaning it for their own use.

Manure

One hundred per cent. use farmyard manure. The number of tons used per acre varies greatly, ranging from four to sixty. The average application is from twenty-five to thirty tons. Where the amount is small, it is on orchards, being applied every two or three years. The heavier applications are used on roots and grain. Seventy per cent. use artificial fertilizer, from three hundred to a thousand pounds per acre, on potatoes, roots, hoed crops, and on grain when seeding down to grass of clover. A certain amount of marsh mud or mussel mud is used on the land. Much might be done in the way of demonstrating to the farmers the advisability of using clovers to enrich their soil in place of using so much artificial fertilizer.

Weeds

Thirty-nine varieties of noxious weeds were reported, couch grass, lady's thumb, pigweed, sow thistle and ox-eye daisy being among the worst. From this it will be seen that much remains to be done in instructing the farmers in the identification and eradication of these pests, and in starting and carrying on a vigorous campaign for the purpose of their extermination or, at least, their control. The causes given for weeds increasing are impure seed grain, allowing weeds to go to seed, buying manure and other common causes. Where weeds are being

kept in check, cutting, hand pulling, good cultivation, and short rotations are practised. Shorter rotations and unremitting watchfulness are much needed in combatting weeds in Nova Scotia. Some attribute the spread of weeds to the fact that they keep no sheep, while others state that they keep sheep on their waste or unbroken land largely for the purpose of keeping it clean and preventing the spread of weeds.

Pests

A smaller number than in some of the other provinces report potato beetle, there being only thirty-five per cent. reporting this pest; but about twenty-five per cent. sustained a loss of twenty-five per cent. of crop, which is a very heavy one. No doubt this could have been avoided had proper precautions been taken in spraying at the right seasons. Eighteen per cent. report potato blight with the loss not heavy in many cases. There is need for more knowledge concerning spraying for insect pests and blight, the loss from which could be materially lessened if intelligently attended to at the proper time. This is also the case with apple scab and codling moth which have done considerable damage. Fifteen per cent. report smut on oats; but state that the loss is hard to estimate. Very few in the province are treating their seed oats for smut. Many other pests are mentioned. In all there is a great field for work in educating the farmers to recognize these pests and to employ methods to combat them.

Water Supply

Seventy-four per cent. obtain water from wells and twenty-one per cent. from springs. Six per cent. of the wells are in the house, and twelve per cent. within ten feet of the house. Many are poorly situated and contamination is almost inevitable. The majority carry the water to the house by hand. Only two per cent. have it piped. A few have arrangements made so that water can be pumped directly into the house.

Fuel

Ninety-two per cent. use wood only, forty-three per cent. have a continuous supply. The average time for the non-continuous wood lots to last at the present rate of consumption is thirty-seven years. If they will last thirty-seven years under ordinary conditions, the application of the simplest principles of forestry might make the supply a permanent one. There is need for more knowledge along this line.

Typhoid

Two per cent. report typhoid in the last ten years. Five cases occurred on one farm where the water supply was taken from a bored well in the stable.

General

Dairying is one of the important branches of farming in the Pictou district. The proper system of rotation is by no means followed. The general rule is after seeding down a field to top dress

in the fall, and leave it to hay as long as it gives a profitable yield, and in many instances it is left some years after that point has been reached. Two of the new weeds are evening primrose and ribgrass, which are supposed to have come in imported clover and timothy seed.

Dairying, beef and sheep raising are important branches of agriculture in the Antigonish district. One of the very troublesome weeds here is the common ragwort which, in some fields, was being kept down by sheep. In Annapolis county, orcharding is the first interest and very little attention is paid to systematic rotation of crops, much of the low land being used altogether for hay and grain.

New Brunswick

Of the area visited forty per cent. was under field crop, nineteen per cent. in unbroken pasture and forty-one per cent. in woods.

Rotation of Crops

About fifty per cent. follow no systematic rotation of crops. About twenty per cent. follow a fairly systematic rotation, the shortest, however, being of four years' duration, as grain, roots, grain, hay or pasture. The balance follow a long course rotation such as roots, grain, with hay or pasture from three to four years or indefinitely. Many of the farms are being carelessly worked, with very little attention to systematic crop rotation or the use of clover and other leguminous crops as a means of improving the fertility of the soil. There is a lamentable lack of system in many of the farm operations; carelessness and neglect being all too evident on many of the farms visited.

Seed Selection

About fifty per cent. do not use systematically selected seed, while the other fifty per cent. use only the fanning mill as a means of grading the seed. Practically no hand selection is followed on the farms visited. If the best parts of the standing fields of grain were kept from the total crop, and then carefully screened and graded, it would be a much better practice than indiscriminately taking grain from the bin for seed.

Weeds

Thirty-three kinds of weeds were reported in New Brunswick; ox-eye daisy, mustard, king devil, couch grass and orange hawkweed are the worst. Fifty per cent. assign impure seed grain as the cause of the foregoing. A number report it to be due to lack of cultivation and to allowing weeds to go to seed in root and hoed crops. Other causes given are wind, neglected roadsides, crooked line fences and ditches. In many localities practically no attention is paid to the cutting of weeds by the roadsides, along line fences or open ditches. Many of the farmers state that it is very discouraging after having worked hard to keep

the weeds in check on their own farms to have their windward neighbours neglect their line fences, roadsides and ditches, and allow them to become distributing centres for many of the noxious weeds mentioned. Roadside inspection is needed for the enforcement of laws where such exist for cutting and preventing weeds from going to seed.

Pests

The two worst pests are the potato beetle and the potato blight, each being reported by forty per cent. of the farmers. The beetle caused an average loss of about fourteen per cent. of crop, while the damage from the blight was somewhat heavier, running from fifteen to twenty per cent. of the crop. Oat rust, apple worm and some other pests were reported; but not many of each. It is evident that knowledge is required in the uses of insecticides and fungicides. Many who have carefully sprayed their potato crops report the only loss to be the cost of the spraying material. More farmers should read the agricultural reports each year. The 1909 report contained a calendar with directions for the preparation and application of the various spray mixtures for fruits, roots and vegetables.

Water Supply

Sixty per cent. get water from wells; thirty-five per cent. from springs. Some of the wells were poorly protected and it is evident that not enough care and attention is given to the question of a pure water supply for the farm home.

Fuel

All use wood for fuel. Ten per cent. have an indefinite or perpetual supply, while the average time estimated for the other lots to last is seventy-one years. Here is an abundant wood supply, and if attention is paid to conserving it, there is no reason why it should not be abundant for all time to come.

Typhoid

On eleven per cent. of the farms there had been typhoid within the last ten years. This is a condition which should not exist, and it would not exist if the farmer would protect his water supply from pollution. This percentage of the disease goes to show that there must be great carelessness regarding the water supply and the sanitary conditions of the farm home. There is much room for improvement in the conveniences and handy appliances of the farm to convey water to the house.

General

The general conditions of the farms in this district showed that there was not enough order or system in their general management, as well as in the rotation of crops and caring for the stock. Many of the farmers, however, seem to realize that they must soon handle their farms differently by cultivating more thoroughly, paying more

attention to shorter rotations, selecting seed and adopting methods to exterminate or control the weeds, and also to the keeping of more and better stock, and purchasing less chemical fertilizer.

Quebec

(English speaking)

Of the area visited, sixty-six per cent. was under field crop, seventeen per cent. in unbroken pasture, and fifteen per cent. in woods.

Rotation of Crops

Twelve per cent. do not follow a systematic rotation of crops. Thirteen per cent. follow a five year rotation, and the rest, while they mention the crops grown, cannot be said to follow anything approaching a systematic rotation. The majority grow grain from four to six years, with hay and pasture three to five, and but very few roots, or they grow hay from four to ten years with a few roots and some grain. Many of the farmers are engaged in the raising of hay for marketting purposes, and in dairying. Very few understand the value of rotation of crops or the value of thorough preparation of the soil before sowing them. Tile drainage is almost entirely unknown. If practised on many of the farms visited, it would be of immense value in reclaiming large areas and in increasing the production of lands now under cultivation.

Seed Selection

Ninety-four per cent. grade their seed grain by the use of the fanning mill. Ten per cent. of those using the fanning mill, hand pick their seed wheat. By many, very little attention is paid to this important branch of farm operations.

Manure

All the farmers visited use barnyard manure at the rate of about fifteen loads per acre on roots and grain. Thirty-five per cent. apply manure as top dressing to meadows. Three per cent. use artificial fertilizer. In many instances, few cattle are kept on the farms. This means that the amount of manure applied each year is sufficient to cover only a very small part of the farm. A lack of knowledge in the care of manure is evident. Too little attention is paid to this valuable asset as a means of replenishing the fertility of the soil.

Weeds

Twenty-nine different kinds of weeds were reported, among which couch grass, sow thistle, Canada thistle, fall dandelion, ragweed, green foxtail, viper's bugloss and ox-eye daisy are the worst. These are all very troublesome. Where they are very prevalent or increasing, the principal causes given are careless neighbours, impure seed

and neglected roadsides. Another cause mentioned is that threshing mills, after having been used on dirty farms, are not properly cleaned before being used on other farms. There are not enough short rotations. The long periods for which many fields are under hay, gives many of the weeds an opportunity to get a firm hold on the land before anything is done in the way of proper cultivation to bring them under control.

Pests

One hundred per cent. report potato beetle, which causes a loss of from five to ten per cent. of the crop. About fifty per cent. report rust on oats. This is largely due to the oats being sown late on land which cannot be worked earlier on account of lack of proper drainage. About thirty per cent. report apple worm, the loss being from five to ten per cent. of the crop. There is room for demonstration work in up-to-date methods of orcharding. About twenty-five per cent. report smut on oats. Very little is done in the way of treating seed grain for smut, hence there is need for help along this line from some source or other.

Water Supply

One hundred per cent. have wells; five per cent. of the wells are in the houses; four per cent. have water piped to the buildings, and ninety-two per cent. either carry the water by hand or have it hauled. Very little has been done in the way of improving the facilities for conveying the water from the well to the buildings.

Fuel

Eighty-two per cent. burn wood only, while twenty per cent. burn wood and coal. About ten per cent. have a perpetual supply of wood on the farm. The average estimated length of time for the other lots to last at the present rate of consumption is thirty-four years. There is much carelessness and waste in connection with the handling of the wood lot and if proper care were exercised many of the lots, which at present are rapidly diminishing, could be made to last for all time.

Typhoid

Five per cent. report typhoid in the last ten years, fourteen cases in all. In three instances where typhoid had occurred, the wells were from ten to fifteen feet from buildings. In nearly every instance where cases were reported, the surrounding land sloped toward the well. Many of the wells are poorly protected and surface water is allowed to seep into them.

General

The general impression gained by those who visited the farms was that the farmers were ignorant of many things which they should know, such as the names of weeds, insects, and the remedial measures generally taken to get rid of them. Few had any idea of the immense value of seed selection and crop rotation. From the ques-

tions asked the different farmers and the peculiar answers sometimes given, together with the state of the farms as seen, the conclusion was formed that there is much need for help along these lines. The herds being small, they had very little to return to the land in the way of barnyard manure.

Quebec

(French speaking)

Eighty-three per cent. of the area visited was under field crop; two per cent. in unbroken pasture and fifteen per cent. in woods.

Rotation of Crops

None follow systematic rotation of crops. Hay and grain are the chief crops, each being grown for an indefinite period. Out of all the farmers visited, only five were pretending to follow anything like a regular rotation, and these could not be considered systematic. Some adopt a system on part of the farm; but on the other portions of the farm it is very irregular. The farms are not generally divided in a systematic way to facilitate regular systematic rotation. The usual practice is to leave the best portions of the farm in hay as long as the yield is satisfactory, while on the remainder grain is grown.

Seed

None use systematically selected seed. Most of the farmers use their own best seed, while a number buy their seed grain and some exchange seed every few years. A number of the farmers have been able to get a start from the samples received from the Experimental Farm. This important subject seems to be fairly well understood and interest in the systematic selection of seed is just now beginning to be evinced. Many acres of second crop clover might have been saved and the seed from it sown. A large number fail to get a stand of clover because they do not sow enough seed. They think they cannot afford to sow seed thickly when they have to buy it. If they saved their own seed they could afford to put on enough to insure a good stand. Many of the farmers do not realize the value of clover in cleaning, ventilating and enriching the soil.

Manure

All those visited use farmyard manure, and about twenty per cent. of these also use artificial fertilizer. Manure is used on hoed crops and as top dressing to meadows. In many cases the amount used is not reported; but where reported, from twenty to twenty-five loads is used on hoed crops, and from ten to fifteen loads as top dressing. The farmers do not know enough about chemical fertilizers to use them successfully, and trust too much in the supposed knowledge of the agents. In many cases the manure is not properly kept.

Weeds Among the worst weeds reported are chicory, ox-eye daisy, couch grass, mustard and milkweed. Some farmers state that where they are now paying more attention to the improving of the farming system and better selection of seed, the weeds are being kept in check, and in some cases are diminishing. Chicory is increasing very rapidly in almost all localities. It is particularly bad along the highways, ditches and fences. Those farmers who are taking good care of the land have fairly clean properties.

Pests The potato bug is practically the only pest the farmers complain very much about, and when the potato crop is properly sprayed there is very little loss outside of the cost of the materials. Rust has been noticed in a few cases on oats which were sown late in the season.

Water Supply The water supply is furnished by rivers, pipe lines, springs and wells. Fifty-eight per cent. have water piped to the house. Seven per cent. have windmills and fourteen per cent. carry water to house by hand. L'Assomption county seems to be one of the most favoured as regards water supply, being furnished by the large rivers which flow around it and through it, as well as by the numerous springs which flow from the hills existing in nearly every parish. The stable wells are often badly situated, being too close to the stables and receiving the drainage water from the yard or manure heap.

Fuel Wood is generally used. Eighty-one per cent. report a continuous supply. Others buy or have a small supply. The majority own a sufficient quantity of wood for their continuous needs, and many for more than that.

Typhoid Thirteen per cent. report typhoid in the last ten years. There was a serious outbreak at one time near L'Assomption which brings up the average. The water used by the majority of those reporting fever was obtained from a pipe line system. It is the opinion of the man who made the survey in L'Assomption county that the progress of agriculture would be greatly increased by sending bulletins to the farmers showing rotations, describing preventive and instructive methods for the handling of weeds, discussing the preparation and selection of seeds and the necessity for having a pure water supply and the most practical way to obtain it.

Manitoba

Of the area visited sixty per cent. was under field crop, twenty-three per cent. in unbroken pasture, one per cent. in woods and sixteen per cent. in summer-fallow.

Rotation of Crops

All the farmers visited reported a rotation of grain crops, with very little or no clover entering into the rotation. The order most generally followed is wheat, wheat, oats or barley and summer-fallow. About seventy per cent. follow this order, and about twenty per cent. practise the following system, wheat for three years, then oats or barley and then summer-fallow. Very little clover is grown, although from the report of crops issued by the Department of Agriculture for Manitoba, we learn that cultivated grasses show an increase in the Province of nearly twenty thousand tons last year. The pleasing feature of this increase is that five thousand tons of this was clover. The need of clover in the rotation is being realized by at least some of the farmers in the Province.

Seed

Twenty-four per cent. do not use selected seed. Seventy-six per cent. use the fanning mill in cleaning the seed. The farmers seem to realize the importance of clean seed, and are making an effort to obtain it by careful fanning mill grading and in some instances by exchanging. The potato and root crops of the Province are far short of what they might be. The yield of these might easily be doubled by careful selection of seed, proper and more thorough preparation of the soil, and more careful attention while the crop is growing.

Manure

Eighty-five per cent. use a little manure. No artificial fertilizer is used. The amount of manure on each farm is so small that it will cover only the garden spot on many of them. Some farmers burn the manure.

Weeds

Thirteen different kinds of weeds were reported, the worst being wild oats, Canada thistle, mustard, and stinkweed. One hundred per cent. report wild oats, and forty-six per cent. report wild oats increasing. This is one of the most vicious weeds found in Manitoba. Ten per cent. hand pull and dig out all but the wild oats, for which they summer-fallow. Thirteen per cent. say they have too much land to give it proper attention or to work it properly. Other causes for the increase of noxious weeds are neglect during the first few years, weeds going to seed on head land, threshing outfits not being properly cleaned before coming on the farm, impure seed, and failure to recognize noxious weeds as such when first introduced.

Pests

Ninety-six per cent. report no loss from pests, and only one report was received of potato beetle.

Water Supply

One hundred per cent. use water from wells. Thirty-eight per cent. have wells in the buildings, while many have the wells very close to the buildings. Sanitary conditions on many of the farms are anything but desirable.

Fuel Sixty-three per cent. use wood and coal and thirty-three per cent. use wood only. Thirty per cent. report wood enough to last for an average of nine years. Twelve per cent. report a perpetual supply. While on most of the farms no wood lots are reported, there is enough scattered wood on the pasture land to last for some years, and in some cases to make a perpetual supply.

Typhoid Six per cent. report typhoid in the last ten years, one case being fatal. One farm had three cases about ten years ago, due, it was thought, to the unsanitary conditions at that time. These, however, have since been improved.

General It was found that on such important questions as that of the prevalency of weeds and their troublesomeness, very few farmers were willing to admit that certain weeds were getting a foothold on their farms. All seem to have been cropping their farms to the limit. Consequently the lands are being depleted of their fertility and are not giving the yields they should or did. Very little fertility is being restored to the land. The farmers have thoughtlessly allowed their farms to become more or less overrun with weeds; but are now paying more attention to this question and are employing means to combat them. There is great room for improvement in the selection of seed, as practically nothing is being done in the way of hand selection. Most farmers keep too little stock, only enough being kept to supply the power for the farm operations, and the needs of the family with regard to the food. Farmers should be growing more clover and keeping more stock, for it is by this means that the original fertility may be restored to the land.

Saskatchewan

Of the area visited sixty-seven per cent. was under field crops, ten per cent. in unbroken pasture, four per cent. in woods, and nineteen per cent. in summer-fallow.

Rotation of Crops The system of cropping followed by about sixty per cent. is as follows, wheat, wheat or oats, then summer-fallow. The balance follow the system of wheat, wheat, wheat, oats, summer-fallow.

Seed Twenty-six per cent. do not use systematically selected seed. Fifty-six per cent. use the fanning mill to grade the seed. Four per cent. use field selected seed, that is, the seed is kept from the best part of the area under crop and graded with the fanning mill. Practically no hand selection is practised. Very little attention is paid to securing choice seed by hand selection and the use of the trial plot.

Manure

Fifty-two per cent. use what manure they have, and some burn the manure and plow in the ashes. Very little attention is paid to manure and what little the farmers have is hauled out on the land close to the buildings, largely for the purpose of getting it out of the way.

Weeds

Among the worst weeds reported are wild oats, stinkweed, wild buckwheat, blue burr and mustard. Where the weeds are becoming more prevalent, the causes given are wind, early neglect, wandering stock and careless neighbours. Early neglect had much to do with the introduction of many of these noxious weeds. The farmers did not recognize in them enemies to be reckoned with and allowed them to get such a foothold that the fight is now a serious one. Where the weeds are being kept under control, good cultivation, hand pulling and summer-fallow are given as the methods for keeping them in check.

Pests

Seven per cent. report rust on the grain. A few report potato beetle and a few smut. The loss is reported as slight in every instance.

Water Supply

Over eighty per cent. obtain water from wells. Water is carried or hauled from the source of supply to the house. There is not enough attention paid to the protection of the wells.

Fuel

About seventy-five per cent. burn wood and coal. Six per cent. have wood lots, and the average time for the supply to last at the present rate of consumption is given as eleven years.

Typhoid

Seven per cent. report typhoid in the last ten years, with one case fatal. In one case the well was twenty-five feet from the house, and in the others, the distance was not given. In some instances, the water was hauled from neighbour's well.

General

The methods of cropping, tillage and management, are fairly typical of the older wheat growing areas of the Province. Generally speaking, weeds are increasing, although in two or three cases, the proprietors of the farms appeared to have maintained practically clean farms. There is absolutely no provision for the maintenance of the fertility of the soil. The principal crop is wheat, which is shipped away and the straw burned. On the average, the barnyard manure will fertilize little more than the garden spot. A few dairymen near the city may in the future furnish the exception. Several are preparing to use a better rotation in order that they may go into mixed farming. The blowing of the soils, the drought season and the weeds are bringing men to see that

the sooner some more permanent system can be established the better it will be for the soil, and the better it will be for future residents of the Province.

Alberta

Sixty-five per cent. of the area visited was under field crop and twenty-five per cent. was in unbroken pasture.

Rotation of Crops It can hardly be said that any systematic rotation of crops is followed. There is a sequence of grain crops; but clover or grasses of any kind are not grown. About eighty per cent. follow a system of wheat, oats and summer-fallow, while a few grow one grain crop after another without giving the land any rest. This, of course, will do very well for a time, but only for a time.

Seed About ninety per cent. report the use of selected seed; but the method of selection is not given. It may safely be said that the practice of grading the seed with the fanning mill would be the most general one.

Manure Twenty-seven per cent. report the use of manure on roots, potatoes and on land close to the buildings. As the amount of stock on most farms is small, very little manure is available, and that is used on the garden spot to produce the vegetables for home use.

Weeds Twelve per cent. report mustard, pigweed, wild buckwheat. Nine per cent. report tumbling mustard, and only three per cent. wild oats. Where weeds are becoming more prevalent the causes given are threshers not cleaning their machines after threshing on dirty farms, wind carrying the seeds for miles and insufficient summer-fallowing.

No pests were reported

Water Supply Ninety per cent. get water from wells, and a few get it from springs and streams. Ninety-eight per cent. carry by hand, or haul, water to the house, and only one has it piped. Better sanitary conditions exist in this Province than in some of the others in that the majority of the wells are a considerable distance from the buildings, and other sources of contamination. Very few conveniences in the way of piping systems or handy appliances for the conveying of the water to the house have been introduced.

Fuel One hundred per cent. burn coal only.

Typhoid No cases were reported in the last ten years.

General There is very little mixed farming practised in Alberta, the main crops being wheat, and then oats or barley and summer-fallow. The water supply is obtained from artesian wells, which are from eighty to one hundred and fifty feet deep. Most of the farmers have large holdings from one hundred and sixty to nine hundred and sixty acres. The fuel used is coal and is obtained from the nearest town or at the mines.

British Columbia

Of the area visited, thirty-eight per cent. was under field crops, twenty-nine per cent. in unbroken pasture, and thirty-three per cent. in woods.

Rotation of Crops On the Lower Mainland, thirty-two per cent. follow no systematic rotation. About forty-five per cent. follow a rotation of roots, grain, hay, the balance using mixed rotations of various kinds. On Vancouver island ten per cent. follow no systematic rotation. Thirty-five per cent. follow a rotation such as hay and pasture for two years, followed by roots, then grain. Thirty-five per cent. follow the roots, grain, hay system, and the balance follow a longer course rotation. In the Okanagan and Kootenay districts about seventy per cent. follow no systematic rotation, while the balance follow various systems into which the growing of potatoes enters to a large extent.

Seed About fifty per cent. do not use selected seed. Ten per cent. state that they use selected seed, but do not give the method of selection employed. Twenty-five per cent. use carefully screened seed. The use of home-grown root seed is reported in two or three instances. This is a branch of the seed work which might be developed in other provinces as well as in British Columbia. The farmers could well be growing turnip, mangel and other root seeds, thus avoiding the introduction of new and noxious weeds in vegetable seed.

Manures Eighty-five per cent. use farmyard manure. Over ninety per cent. on the lower mainland use manure, particularly on roots. Very few use artificial fertilizer, there being only four per cent. reporting its use on roots. Over ninety per cent. of the Vancouver island farmers use manure for roots, grain and top dressing at twenty to twenty-five loads per acre. Here we find the use of artificial fertilizer quite general. About seventy per cent. of the farmers apply from two hundred to four hundred pounds per acre on the root crops. Seventy-five per cent. of the Okanagan and Kootenay farmers use manure at the rate of about twelve loads per acre, and twenty per cent. of these farmers use artificial fertilizers.

Weeds Twenty-eight varieties of weeds are reported. Among the worst are mustard, Canada thistle, pigweed, chickweed, shepherd's purse and wild flax. Twenty per cent. report weeds introduced through the use of impure grass seed, pig feed and chicken feed; some coming from the United States and some from the prairie provinces. Seven per cent. report railroad construction camps as being responsible for bringing in new weeds in horse feed.

Pests Twenty-five per cent. report damage from turnip aphis to the extent of about fifty per cent. of the crop. A few report apple scab causing a loss of about thirty per cent. of the crop.

Water Supply About forty per cent. obtain water from wells, and forty per cent. from springs. Thirteen per cent. obtain water from streams or rivers. About twenty per cent. carry water to the house by hand. Forty per cent. have water piped to the house, and a few have standpipes and windmills.

Fuel Eighty-five per cent. use wood only, sixty per cent. having wood lots. About forty per cent. have a supply which will last indefinitely. Where the time for the other lots to last is given, the average is forty years, and no doubt if care be taken of these lots they may be made to last indefinitely.

Typhoid Three per cent. report typhoid in the last ten years. In one case, the well was under the house. In another, the supply was obtained from a spring and cistern. In many cases the wells are not properly protected.

General Very little grain, with the exception of oats, is grown. Dairying is carried on to a large extent, and soiling crops are grown to a large extent. Many grow mixed peas and oats for hay. Every year corn is coming more and more to the front. Clover is one of the great crops here, and judging from the stubble left there must have been a splendid crop of oats in 1910. Fruit growing is increasing. The poultry industry is carried on here on a very large scale. This is a very profitable business and one which is increasing in popularity each year. In the Okanagan district the farms on the whole are run only fairly well, and the farmers could obtain more from their land by scientific rotation of crops. Farmers do not know enough about artificial fertilizers to use them to the best advantage. Weeds were allowed to grow unchecked on public roads, railways and vacant lands. In the Grand Forks district, the farmers stated that as long as weeds were allowed to grow unchecked on the railways and public roads, it would be impossible for them to keep them off their farms

On the Lower Mainland the farmers are going into dairying more and more each year. The pleasing feature of the farming in this district is that a large number of the farmers follow short rotations of crops and clover is grown regularly in these rotations. The average hay crop was stated to be from three to five tons per acre.

One of the great drawbacks of this district is the need of better roads. The roads so far have received very little attention, and as they have much to do with the general prosperity and success of the community, they should receive early and careful attention.

WORK OF THE COMMITTEE ON LANDS IN 1910

Dr. J. W. Robertson, Chairman of the Committee on Lands, in summarizing the work of his Committee for the year, at the Second Annual Meeting of the Commission of Conservation at Quebec on Jan. 17, 1911, said that his work as Chairman of the Royal Commission on Industrial Training and Technical Education had brought out much useful information bearing directly on the problems being investigated by the Commission of Conservation. The *possessions of the people* in their natural resources were being surveyed and considered by the Commission of Conservation, and the *ability of people* to make the most of these through development, and to conserve them by utilization and improvement was being inquired into by the Commission on Industrial Training and Technical Education.

In regard to waterways and water-powers, forests, fisheries and, to some extent, mines and minerals, something definite towards conservation could be accomplished by means of regulations laid down by legislation. For the protection of the lands, the conservation of fertility and the prevention of the spread of noxious weeds, much less could be done by legislation. Most must be done by means of forming and directing intelligent opinion among farmers themselves and by furnishing such information and guidance as would make them competent and willing to make the best use of their lands. While other resources might be under the management of a few corporations or companies, the ownership and control of lands were in the hands of multitudes of individuals, each acting separately and individually. Because the task was more difficult and complex, it was none the less needful and advantageous that it should be done well.

Rotation of Crops

For the Committee on Lands last year a survey was made of nine hundred and eighty-five farms in the various provinces of the Dominion, or an average of rather more than one hundred farms for each province. From the survey it was gathered that, taking the whole number, not more than nine per cent. follow any intelligent and effective system of rotation of crops. Many farmers take rotation to mean any order of sequence for one crop to follow another. Instead of that, rotation of crops implies that during each year while its crop is growing, the best preparation is being made in the same field for the succeeding crop and for the preservation of the fertility of the soil and its freedom from weeds. In some localities the percentage of farmers who follow a good rotation is as high as fifty per cent. in other localities

not a single farmer reports any systematic rotation of his crops. Lack of rotation in one large area in the Northwest extending to about five hundred square miles is given as the reason for the destruction of the fibrous material in the soil which formerly held it in place. From that area it is reported that from want of root fibres in the soil, winds in the spring sometimes carry off the surface soil including the seed, or else leave the seed bare. Some Western towns might be a case of Nineveh over again, smothered into oblivion from want of care in protecting the soils. The two following statements are typical of others made by farmers themselves: "Farms are being worn out and are not giving returns they did." "Farmers have thoughtlessly allowed their farms to become more or less overrun with weeds, but now are thoughtful and alert and are combatting the weed pest."

Weeds

With regard to weeds in the Western provinces, wild oats are reported as the worst, all of the one hundred farmers in Manitoba whose farms were surveyed reporting wild oats; seventy-one per cent. in Saskatchewan reported wild oats, and only three per cent. in Alberta. Evidently the vicious weed is travelling and spreading westward. The Russian sow thistle, which is reported new in Manitoba within five years, is a dangerous weed which is spreading at an alarming rate throughout Canada. Sixty-three per cent. of the farmers visited in Quebec report the sow thistle as prevalent, and thirty per cent. of them report it becoming worse. Sixty-seven per cent. of the one hundred farms visited in Prince Edward Island report the presence of sow thistle and twelve per cent. of them report it becoming worse. The ox-eye daisy is reported as prevalent throughout portions of Quebec, seventy-four per cent. of the farmers reporting its presence and thirty per cent. reporting it becoming worse.

Wood for Fuel

In the matter of wood lots on farms for fuel, on the farms which have some supply of trees, the following shows the average of the number of years reported by the farmers during which the wood will last for fuel for their houses:

Manitoba.....six years;
Saskatchewan.....eleven years;
Ontario.....nineteen years;
Prince Edward Island.....twenty years.

In other provinces, the wood lots are estimated to last for over thirty years; and in Nova Scotia, New Brunswick, and in some parts of Quebec practically perpetually.

Water in Farm Houses

In the matter of water for house supply, only about ten per cent. of the farmers have running water in the kitchens, most houses depending on wells at some distance. One of the means of conserving the time, strength and pride in their houses, of the

women in rural homes, would be the provision of an adequate supply of pure water on tap in the house. In most cases, including the cost of a windmill where that is the best power, the cost need not exceed one hundred and twenty-five dollars including power, tank and piping. The drinking of impure water has the effect of depressing the vitality of the whole family, making them more liable to disease and resulting in loss of efficiency. These are evils in addition to the occasional cases of fever which come from drinking well water into which the seepage from house or stables has found its way.

Crops Might be Doubled

The survey for the Committee on Lands had brought out the fact that, if farmers on the average throughout Canada would farm as well as the fifty best farmers whose farms had been surveyed, the result would be the doubling of the quantity of field crops from the land now occupied in Canada within a period of three years. Since the valuation of field crops in Canada ranges from five hundred and seven to five hundred and fifty millions of dollars per annum, the importance of that possibility is seen. It is not suggested that it is practicable to bring about such a change in three years; but by such means as may be taken, the quantity of field crops from the farms of Canada could be increased one hundred per cent. within twenty years, besides all the additions that would be made by the occupation of new lands, and the inflow of new settlers. One of the best means towards that result would be for municipal authorities, Provincial governments and the Federal powers to join in recognizing these best farmers as illustration farmers and in holding up the example of their good practice in attractive ways in order that others might follow their systems and methods.

Dr. Robertson recommended the enlargement of the Committee on Lands and a continuation and extension of its work along similar lines.

AGRICULTURAL PRODUCTION IN CANADA[a]

The area in crops in Canada in 1891 was 15,662,811 acres; in 1901 it was 19,763,740 acres, an increase of twenty-six per cent., and in 1910 it was 32,711,062 acres, an increase of sixty-five per cent. over 1901. The area in wheat, oats and barley in 1910 was 20,992,900 acres, being 1,229,160 acres more than the area of all crops in 1901.

Field Crops, 1901, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	42,223,372	55,572,368	139,989,600
Barley	17,222,795	22,224,366	45,147,600
Oats	83,428,202	151,497,407	323,449,000
Rye	1,341,325	2,316,793	1,543,500
Corn in ear	10,711,380	25,875,919	18,726,000
Buckwheat	4,994,871	4,547,159	7,243,900
Peas	14,823,764	12,348,943	6,538,100
Beans	800,015	861,327	1,177,800
Flax seed	138,844	172,222	3,802,000
Grass and clover seed	346,036	288,275	
Potatoes	53,490,857	55,362,365	74,048,000
Field roots	49,679,636	76,075,642	95,207,000
Hay (in tons)	7,693,733	7,852,731	15,497,000
Tobacco (in pounds)	4,277,936	11,266,732	
Hops (in pounds)	1,126,230	1,004,216	
Mixed grains (in bushels)	.....	.....	19,433,600
Sugar beets	.....	.....	155,000

Live Stock, 1891, 1901 and 1910

	1891	1901	1910
Horses	1,470,572	1,577,493	2,213,199
Milch cows	1,857,112	2,408,677	2,853,951
Other cattle	2,263,474	3,167,774	4,260,963
Sheep	2,563,781	2,510,239	2,598,470
Swine	1,733,850	2,353,828	2,753,964

a The figures for 1891 and 1901 are taken from the census reports of those years. The figures for dairy production in 1907 are taken from Census and Statistics Bulletin No. VII. All figures for later than 1907 are taken from the Census and Statistics Monthly, of the Dominion Department of Agriculture, and are estimates based upon returns made by voluntary agricultural correspondents; consequently, they have not the same statistical value that attaches to the figures of the decennial census.

Accurate figures for fruit production since 1901 are not available.

Animals killed or sold for slaughter in 1891 were: cattle 957,737; sheep 1,464,172; swine 1,791,104. Of home-made butter, there was 111,577,210 lbs. manufactured. In 1901, animals killed or sold for slaughter were: cattle 1,110,209; sheep 1,342,288; swine 2,555,413; poultry 7,063,597; while there was 105,343,076 lbs. of home-made butter and 84,132,802 doz. eggs produced. In 1891 there were 1,736 butter, cheese and condensed milk factories which turned out products valued at $10,780,879. In 1901, there were 3,580 factories producing a product valued at $29,731,922. In 1907, the value of products was $35,457,543.

Orchards, Fruits and Vegetables, 1891 and 1901

Fruit Lands	1891 (Acres)	1901 (Acres)
Orchards	378,396	354,545
Vegetables and small fruits	77,140	116,517
Nurseries	2,975	1,561
Vineyards	5,951	5,600
Total	464,462	478,223

Fruit Trees and Fruits, 1891 and 1901

Kinds	1901[a]		Quantities of Fruit	
	Non-Bearing (number)	Bearing (number)	1891 (Bushels)	1901 (Bushels)
Apple trees	4,028,086	11,025,789	7,563,894	18,626,186
Peach trees	481,790	819,985	43,690	545,415
Pear trees	344,808	617,293	229,283	531,837
Plum trees	963,426	1,452,269	269,631	557,875
Cherry trees	385,228	903,140	197,090	336,751
Other fruit trees	37,555	141,870	324,789	70,396
Grape vines	475,243	2,308,353	12,252,331 lb.	24,302,634 lb.
Small fruits	.....	.....	.....	21,707,791 qts.
Maple sugar	.....	.....	25,088,274 lb.	17,804,825 lb.

The following is taken from the Report of the Fruit Branch of the Ontario Department of Agriculture, 1909:

Ontario produces 75 per cent. of all fruits grown in Canada;
60 per cent. of the plums;
70 " " " " apples;
80 " " " " small fruits and pears;
99 " " " " peaches and grapes.

[a] In the census of 1891, the number of fruit trees was not ascertained.

BRITISH COLUMBIA[a]

In 1891, the area in crops was 115,184 acres; in 1901, it was 171,447 acres. The increase in the area of land under grain crops in the ten years was only 12,199 acres, mostly in oats, and the increase in production was 460,945 bushels. The area in potato and other field roots increased by 4,531 acres and the products by 389,890 bushels; and the area in hay and forage crops increased by 39,349 acres and the products by 71,297 tons. There was no substantial increase made in live stock from 1891 to 1901. In 1891, the value of dairy products was $3,530; in 1901 it was $105,690.

Fruit, 1891 and 1901

	1891 (Bushels)	1901 (Bushels)
Apples	76,856	221,294
Peaches	1,494	2,250
Pears	12,156	18,413
Plums	19,775	50,466
Cherries	4,227	9,900
Other fruits	7,612	2,494

The fruit industry in British Columbia has made rapid advances in the last few years. In 1901, there were 567,000 fruit trees; in 1903, there were 1,000,000 trees; and in 1905, the number had almost reached the two and a half million figure.

MANITOBA

The area in crops in 1891 was 1,229,041 acres; in 1901, it was 2,756,106 acres; in 1910, it was 5,318,989 acres.

Field Crops, 1891, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	16,092,220	18,353,013	41,159,000
Barley	1,452,433	2,666,803	13,826,000
Oats	8,370,212	10,592,660	41,742,000
Rye	.....	.....	92,400
Flax	.....	.....	290,000
Potatoes	.....	.....	2,838,000

[a] Data are not available to make comparisons for British Columbia as in the other provinces.

Live Stock, 1891, 1901 and 1910

	1891	1901	1910
Horses	86,735	163,867	244,987
Milch cows	82,712	141,481	164,746
Other cattle	147,984	208,405	314,995
Sheep	35,838	29,464	30,266
Swine	54,177	126,459	142,312

In 1891 the value of dairy products from factories was $103,887; in 1901 it was $416,272; while in 1907, it was $533,263.

NEW BRUNSWICK

The area in field crops in 1891 was 736,248 acres, in 1901, it was 897,417 acres, and in 1910, it was 1,050,152.

Field Crops, 1891, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	209,809	381,699	371,000
Barley	100,917	99,050	73,000
Oats	3,025,329	4,816,173	6,351,000
Buckwheat	1,136,528	1,390,885	1,693,000
Potatoes	4,827,830	4,649,059	7,486,000
Field roots	974,363	2,070,486	1,417,000
Hay (in tons)	476,069	512,584	1,261,000

While there was progress in live stock during the ten years from 1891 to 1901, it was not marked.

Live Stock, 1891, 1901 and 1910

	1891	1901	1910
Horses	59,773	61,789	66,855
Milch cows	106,649	111,084	122,136
Other cattle	98,043	116,112	110,389
Sheep	182,941	182,524	203,620
Swine	50,945	51,763	91,250

The value of dairy products from factories in 1891 was $29,152; in 1901, it was $245,695; in 1907, it was $377,822.

Fruits, 1891 and 1901

	1891 (Bushels)	1901 (Bushels)
Apples	259,615	490,434
Peaches	35	77
Pears	96	262
Plums	3,784	4,306
Cherries	1,243	4,058
Other fruits	7,602	740

NOVA SCOTIA

The area of crops in 1891 was 723,825 acres; in 1901, it was 730,146 acres; in 1910, it was 930,935.

Field Crops, 1891, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	165,806	248,476	480,000
Barley	227,530	181,085	264,000
Oats	1,559,842	2,347,598	5,723,000
Buckwheat	184,421	196,498	531,000
Potatoes	5,113,612	4,394,413	6,432,000
Roots	1,349,076	2,074,806	7,012,000
Hay (in tons)	632,391	658,330	1,284,000
Mixed grains (in bushels)	.....	.....	259,000

Live Stock, 1891, 1901 and 1910

	1891	1901	1910
Horses	65,047	62,508	68,721
Milch cows	141,684	138,817	148,948
Other cattle	183,088	177,357	180,189
Sheep	331,492	285,244	358,263
Swine	48,048	45,405	69,958

The number of live stock was smaller in 1901 than it was in 1891.

The value of dairy products from factories in 1891 was $130,675; in 1901, it was $264,767; in 1907, $71,113. While there was a marked decline from 1901 to 1907 in dairy products from the factories, there has been a large increase in the production of home-made products.

Fruits, 1891 and 1901

	1891 (Bushels)	1901 (Bushels)
Apples	1,051,592	1,978,735
Peaches	534	2,672
Pears	7,115	12,869
Plums	9,246	24,299
Cherries	7,482	14,502
Other fruits	31,561	1,908

ONTARIO

The area of field crops in 1891 was 8,166,499 acres; in 1901 it was 9,212,478 acres; in 1910 it was 10,179,705 acres.

Field Crops, 1891, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	21,314,582	28,418,907	17,805,000
Barley	13,419,354	16,087,862	20,727,000
Oats	47,160,246	88,138,974	128,917,000
Rye	1,064,345	2,032,385	923,000
Corn in ear	9,835,737	24,463,694	17,853,000
Buckwheat	1,470,511	1,056,998	3,052,000
Peas	12,760,331	11,351,646	5,692,000
Potatoes	17,635,151	20,042,258	26,163,000
Roots	41,200,779	63,368,463	70,614,000
Hay (in tons)	3,465,633	2,852,465	6,749,000
Mixed grains (in bushels)	.....	3,365,554	14,884,000

Live Stock 1891, 1901 and 1910

	1891	1901	1910
Horses	771,838	721,138	802,949
Milch cows	876,167	1,065,763	1,243,680
Other cattle	1,064,506	1,422,043	1,629,364
Sheep	1,021,769	1,046,456	1,032,227
Swine	1,121,396	1,562,696	1,481,058

The value of dairy products from factories in 1891 was $7,569,338; in 1901, it was $15,070,922; in 1907, it was $17,226,487.

Fruits, 1891 and 1901

	1891 (Bushels)	1901 (Bushels)
Apples	5,043,612	12,645,420
Peaches	40,626	517,065
Pears	208,887	405,288
Plums	171,335	265,876
Cherries	106,658	105,211
Other fruits	208,415	33,474

PRINCE EDWARD ISLAND

The area of field crops in 1891 was 409,940 acres; in 1901, it was 447,737 acres; in 1910, it was 528,852 acres.

Field Crops, 1891, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	613,364	738,679	615,600
Barley	147,880	105,625	159,600
Oats	2,922,552	4,561,097	6,778,000
Buckwheat	84,460	49,689	116,900
Potatoes	7,071,308	4,986,633	4,915,000
Roots	2,005,453	3,932,591	4,155,000
Hay (in tons)	132,959	168,326	495,000
Mixed grains (in bushels)	.....	227,146	636,600

Live Stock, 1891, 1901 and 1910

	1891	1901	1910
Horses	37,392	33,731	34,121
Milch cows	45,849	56,437	55,365
Other cattle	45,846	56,432	57,648
Sheep	147,372	125,546	110,599
Swine	42,629	48,007	48,623

The value of dairy products from factories in 1891 was $8,448; in 1901, it was $597,562; in 1907, it was $340,749.

Fruits, 1891, and 1901

	1891 (Bushels)	1901 (Bushels)
Apples	52,018	155,630
Peaches	.....	
Pears	.....	258
Plums	1,479	3,985
Cherries	4,265	17,146
Other fruits	2,473	2,437

QUEBEC

The area of field crops in 1891 was 4,064,716 acres; in 1901, it was 4,704,396 acres; in 1910, it was 5,457,050 acres.

Field Crops, 1891, 1901 and 1910

	1891 (Bushels)	1901 (Bushels)	1910 (Bushels)
Wheat	1,646,882	1,968,203	1,827,000
Barley	1,580,197	2,535,597	2,547,000
Oats	17,818,589	33,536,677	48,927,000
Corn in ear	826,179	1,384,331	860,000
Buckwheat	2,118,197	1,849,596	1,851,000
Peas	1,912,463	908,656	729,000
Potatoes	15,861,797	17,135,739	21,271,000
Roots	2,656,587	3,526,187	10,159,000
Hay (in tons)	2,243,435	2,581,823	5,502,000
Mixed grains (in bushels)	.....	3,523,507	3,508,000

Live Stock, 1891, 1901 and 1910

	1891	1901	1910
Horses	344,290	320,673	368,419
Milch cows	549,544	767,825	856,151
Other cattle	419,768	598,044	600,277
Sheep	730,286	654,503	549,068
Swine	369 608	404,163	549,068

In 1891, the value of dairy products from factories was $2,918,527; in 1901, it was $12,874,377; in 1907, it was $15,144,738.

Fruit, 1891 and 1901

	1891 (Bushels)	1901 (Bushels)
Apples	1,034,139	1,896,229
Peaches	927	
Pears	844	2,378
Plums	60,513	109,141
Cherries	68,210	136,789
Other fruits	60,177	20,104

SASKATCHEWAN, ASSINIBOIA AND ALBERTA

The area of field crops in 1891 was 190,358 acres; in 1901, it was 844,013 acres.

Field Crops, 1891 and 1901

	1891 (Bushels)	1901 (Bushels)
Wheat	1,792,409	5,103,972
Barley	215,460	474,554
Oats	1,628,344	6,061,662
Potatoes	538,126	1,277,793
Roots	429,577	234,878
Hay (in tons)	155,870	431,157

Live Stock, 1891 and 1901

	1891	1901
Horses	60,976	152,882
Milch cows	37,003	93,499
Other cattle	187,241	435,709
Sheep	64,920	128,245
Swine	16,283	71,581

The value of dairy products from factories in 1891 was $17,322; in 1901, it was $156,637.

SASKATCHEWAN

The area of crops in 1910 was 7,436,560 acres. The production of wheat was 81,139,000 bushels; oats, 61,367,000 barley; 3,598,000; flax, 3,448,000; potatoes, 2,658,000; roots, 487,000; hay, 23,000 tons.

Of live stock there were: horses, 332,922; milch cows, 138,455; other cattle, 431,164; sheep, 135,360; swine, 125,788. In 1907, the value of dairy products from factories was $38,549.

ALBERTA

The area of crops in 1910 was 1,808,719. The production of wheat was 6,593,000 bushels; oats, 23,644,000; barley, 3,953,000; potatoes, 2,285,000; roots, 563,000; hay, 57,000 tons.

Of live stock there were: horses, 294,225; milch, cows, 124,470; other cattle, 926,937; sheep, 179,067; swine, 143,560. The value of dairy products from factories was $387,250.

COMPARATIVE CROP YIELDS

The crops of the last census year (the season of 1900) were so generally affected by drouth in Manitoba and the North West Territories that the figures do not give a fair comparison of yields. In Alberta, where the precipitation was greatest, the yields were not so much affected.

Data are not obtainable to make a complete comparison of yields for all the provinces. Figures for the purpose of comparison should represent the average for a number of years, as the yield of a census year may be above or below the average. The figures obtainable, though incomplete, are herewith presented.

Grain Yields in Ontario

The following statement shows the average annual yields per acre of fall and spring wheat, barley and oats in the province of Ontario for each of the ten-year periods, 1882–1891, 1892–1901 and the nine years 1902–1910, according to the agricultural statistics of the Ontario Bureau of Industries. Ten year periods have been taken with the object of eliminating the effects of seasonal variation.

Grain Yields in Ontario, 1882-1910

Crop	1882–1891 (Bush. per Acre)	1892–1901 (Bush. per Acre)	1902–1910 (Bush. per Acre)
Fall wheat	20·00	20·04	23·73
Spring wheat	15·76	15·17	17·96
Barley	26·03	26·26	30·79
Oats	35·12	34·57	37·09

While allowance may be made for causes other than improved skill in cultivation, such, for instance, as a decreased total area involving withdrawal of a particular crop from inferior land, it is reasonable to infer that improved methods of cultivation, including the use of better seed, have been the main factors in bringing about the results above described.

New Brunswick

The following from the Report of the Department of Agriculture of New Brunswick for 1910 gives the average yield of the principal crops for the last thirteen years:

Crop	Bush. per Acre
Wheat	18.40
Oats	29.10
Buckwheat	22.10
Potatoes	134.90

Prairie Provinces

The following table gives the yields of the principal crops for Manitoba and each of the territories for the census years 1891 and 1901, together with the averages per acre, and also the average yield per acre of crops for the five years 1905–1909:

Grain Yields in the Prairie Provinces, 1891-1909

Kind of Crop	Yield per Acre (Bushels)		
	1891	1901	1905–1909
Manitoba—			
Wheat	17·94	9·34	17·87
Barley	25·70	19·09	30·00
Oats	32·66	18·46	39·03
Alberta—			
Wheat	18·72	18·51	20·79
Barley	26·90	25·97	25·47
Oats	25·65	32·16	34·35
Assiniboia—			
Wheat	15·55	8·21	
Barley	24·05	12·06	
Oats	26·28	14·78	
Saskatchewan—			
Wheat	16·94	13·13	20·76
Barley	25·96	21·67	23·62
Oats	33·29	25·58	36·73
Totals for the Provinces and Territories—			
Wheat	17·70	9·40	19·80
Barley	25·67	19·32	26·36
Oats	31·45	19·98	36·70

Comparative Grain Yields in the Eastern Provinces,* 1891-1901

Kind of Grain	YIELD PER ACRE	
	1891 (Bushels)	1901 (Bushels)
Wheat	14·30	18·53
Barley	19·31	26·88
Oats	20·00	29·64

*Ontario, Quebec, Prince Edward Island, New Brunswick and Nova Scotia.

Average Crop Yields in Eastern Provinces, 1901

Kind of Crop	New Brunswick (Bushels)	Nova Scotia (Bushels)	Ontario (Bushels)	P. E. Island (Bushels)	Quebec (Bushels)
Wheat	14·14	15·21	19·10	17·45	14·07
Barley	21·62	23·48	27·45	23·15	24·35
Oats	25·76	25·77	32·55	27·73	24·84
Potatoes	115·27	117·31	113·76	149·27	134·71
Other roots	290·84	316·42	374·11	441·61	390·54
Hay and forage (in tons)	0·94	1·19	1·39	0·94	1·08

In the averages of field crops for the harvest season of 1900, Ontario is first in wheat, barley, oats, hay and forage; Prince Edward Island is first in potatoes and other roots; Quebec is second in barley, potatoes and other roots; and Nova Scotia is second in hay and forage.

Canada According to the Census and Statistics Monthly, the average yield of field crops in Canada and in each of the provinces in 1910 was as follows:

Crop Yields in Canada in 1910

	Fall Wheat (Bushels)	Spring wheat (Bushels)	Oats (Bushels)	Barley (Bushels)
Canada	23·49	15·53	32·79	24·62
Prince Edward Island	.....	20·52	36·48	28·00
Nova Scotia	.....	22·85	39·52	30·33
New Brunswick	.....	19·03	29·69	35·29
Quebec	.....	18·38	29·66	24·49
Ontario	25·24	20·19	39·40	29·75
Manitoba	.....	13·65	28·76	20·21
Saskatchewan	.....	16·73	31·10	26·18
Alberta	12·59	12·32	24·27	20·32

FISHERIES AND GAME

JURISDICTION OVER FISHERIES

FEDERAL JURISDICTION.—The Parliament of Canada has (a) exclusive legislative jurisdiction over all matters pertaining to "Sea Coast and Inland Fisheries."[a]

(b) exclusive competence to enact fishery regulations and restrictions.[b]

(c) the right to impose "a tax by way of license as a condition of the right to fish."[c]

Provincial Jurisdiction The Legislatures of the Provinces have (1) all proprietary rights in respect of fisheries which they held before Confederation. This includes (by virtue of s. 92, item 13, B.N.A.Act) control of the manner by which a private fishery is transferred or disposed of, and the rights of succession in respect of it.[d]

(2) the exclusive power to make laws in relation to matters coming under the caption, "Direct taxation within the Province in order to the Raising of a Revenue for Provincial Purposes."[e]

This has been interpreted by the Judicial Committee of the Imperial Privy Council as empowering the Provinces to lay a tax on provincial fisheries in addition to any imposed by the Dominion Parliament.[f]

"Following the decision of the Imperial Privy Council, the licensing of the fisheries of the province of Ontario, together with those of the inland portions of the province of Quebec, was handed over to the local governments.[g]

By an alleged tacit agreement[h] between the Dominion and the Maritime Provinces, made shortly after the Imperial Privy Council decision, the Dominion was to administer the Fisheries Service as formerly, pending a submission to the courts of the rights as regards Federal and Provincial authorities in tidal waters and within the three-mile limit. The matter has dragged on and no test case was submitted till last autumn (1910) when the dispute as affecting British Columbia was considered by the Supreme Court. The case is still pending.

NOTE.—New Brunswick disputes this alleged tacit agreement and passed, in April, 1910, an Act in addition to "The Fisheries Act, 1903," whereby provincial permits are issued to non-resident anglers.

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a British North America Act, s. 91, item 12.
b Decision of Judicial Committee of the Imperial Privy Council, Fisheries Reference, 1898.
c Ibid.
d Ibid.
e British North America Act, s. 91, item 2.
f Decision of the Imperial Privy Council, Fisheries Reference, 1898.
g Letter of Deputy Minister Desbarats to Hon. W. C. H. Grimmer, April 13, 1910.
h Desbarats to Grimmer, April 30, 1910.

SUMMARY OF PRINCIPAL LAWS AND REGULATIONS

BELOW is given a summary of the more important provisions of the Dominion and Provincial laws and regulations relating to fisheries. The Fisheries Act (*R. S., Canada, Chap.* 45), constitutes the basis for the administration of the extensive fisheries under the control of the Federal Government; but the regulations made from time to time by Order in Council have very materially changed the specific clauses of the Act as originally passed.

The Fisheries Act

Leases and Licenses The Minister of Marine and Fisheries may issue leases or licenses to fish for a period not exceeding nine years. If a lease or license for more than nine years is required, it may be issued only under authority of the Governor in Council.

Whales Licenses are required of all whaling boats and of all those engaging in the manufacture of whale oil or other commercial product obtained from whales.

Renewable nine year licenses may be granted.

No such license shall be granted till the Minister has

(a) approved of factory site.

(b) assurance of satisfactory conduct of the business.

(c) plans of machinery, etc., on file.

The license is forfeited for non-user in two years.

Fees: $800 for first year.
$1,000 for second year.
$1,200 for third and each ensuing year.

After the first two years the Governor in Council may exact two per cent. of gross earnings in lieu of fees.

Regulations may be made for the enforcement of the law by the Governor in Council.

No vessel shall kill a whale within half a nautical mile of another vessel.

Harpoons only are allowed in killing whales.

Exception as to Hudson Bay: The license fee payable for whaling boats hunting in Hudson bay or the waters north of the 55th parallel of n. latitude, if not so hunting in connection with a factory established in Canada, shall be $50 a year.

Cod Mackerel, herring or caplin seines are not to be used for taking codfish. No codfish seine shall be of a less sized mesh than 4 in. in extension of the arms, and 3 in. in the bottom of the seine.

Seal No one fishing with a boat shall wilfully disturb any sedentary seal fishery. Disputes between occupiers of seal fisheries regarding limits or manner of setting nets shall be summarily settled by a fishery officer or justice of the peace.

Salmon Close season for net fishing:

Quebec and Ontario—July 31 to May 1.
New Brunswick and Nova Scotia—Aug. 15 to Mar. 1.
Prince Edward Island—Sept. 1 to Dec. 31.

In New Brunswick, Nova Scotia and Quebec, fly fishing is legal from Feb. 1 to Aug. 15, but in Cape Breton Island the season extends from June 1 to Sept. 26. Also, on the north shore of the St. Lawrence river, east of but not including the Natashkwan river; in the Rimouski river, Murray river, river du Gouffre and in the Jacques-Cartier river, Portneuf county, fly surface fishing is permitted from Feb. 1 to Aug. 31 inclusive.

Salmon fry, parr and smelt shall not be caught at any time.

Size limit for salmon and grilse, 3 lbs.

In British Columbia, licenses costing $50 each are required of those operating salmon canneries or salmon curing establishments for commercial purposes.

Net Regulations Minimum size of salmon net mesh shall be 5 in. extension measure. Nets are to be used only in tidal water. Swing nets are prohibited.

Nets must be set 250 yards apart.

Drifting for salmon is prohibited, except when under license in New Brunswick and British Columbia.

Drift nets shall not obstruct more than one-third of the width of a river.

No salmon shall be caught within 200 yards of salmon spawning streams.

Taking or sale of salmon roe is prohibited except by permission, and for the special purpose provided for in this Act.

Trout Trout close season:

Ontario—Speckled trout, Sept. 15 to May 1.
Salmon trout, Nov. 1 to 30.
Lake trout, Oct. 15 to Dec. 1.
Quebec—Salmon trout, lake trout or muskallunge, Oct. 15 to Dec. 1.
Speckled trout, Oct. 1 to Apr. 30.
Prince Edward Island—Any trout, Oct. 1 to Mar. 31.

Exceptions: Except in the tidal waters of Quebec on the north shore of the river St. Lawrence from the mouth of the river Saguenay to

Blanc Sablon, no one shall fish for or catch trout except by means of hook and line. But in Ontario such shall not apply to salmon trout.

Indians in Manitoba, Alberta, Saskatchewan, North West territories and Yukon may take speckled trout at any time for their own use.

Whitefish Close season:

Ontario, Nov. 1 to 30. But in the waters of lake Erie bordering on the counties of Haldimand, Monck, Kent and Essex, and around Pt. Pelee island; as well as in the waters of lake St. Clair, bordering on the counties of Essex and Kent, the above close season is abolished so far as fishing for whitefish is concerned.

Quebec, Nov. 10 to Dec. 1.

Manitoba, Saskatchewan, Alberta, North West Territories and Yukon, Oct. 20 to Nov. 1.[a] Fishing by Indians shall be unrestricted if for domestic purposes.

Whitefish fry must not be destroyed.

Minimum size of nets:

Seines for whitefish must be at least 4 in. extension measure.

Gill-nets are not to be set within two miles of seining ground.

Lobster Fisheries For canning or curing lobsters, a license from the Minister at the rate of $5 for the first 4,800 lbs. or fraction thereof, and $2 for each additional 4,800 lbs. or fraction thereof, is required.

Imported cases of lobsters must be stamped with the government label.

An annual return of fishermen, employees, gear, pack, etc.,is required of each lobster factory on May 31 of each year under a penalty not exceeding $400.

Labels on empty cases must be obliterated within 7 days after the commencement of the close season.

Managers of lobster factories shall, on request of the Minister, keep and deliver over all eggs necessary for hatching operations.

Under certain conditions, pound licenses, costing $75 each, are required.

Possession of Fish Selling or possessing fish caught during close season or in any manner prohibited by law, is illegal. Such fish may be confiscated by any customs officer, excise officer, police officer, constable or market clerk.

Particulars of such seizures shall be sent to the fishery officer in charge of the district.

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[a] It should be noted that the close seasons now vary with the different sections of these provinces to which they apply.

Fishways

Every dam, slide or other obstruction across a stream shall, where the Minister so determines, be provided with an efficient fishway, the form, place and capacity of which shall be prescribed by a fishery officer. This shall always be kept open and shall be supplied with sufficient water during such period as the fishery officer shall determine.

The Minister may authorize the payment of one-half the expense of construction of fishways.

If necessary, the Minister may construct a fishway where needed and recover cost of same by legal action.

Injuring a fishway or obstructing the passage of fish in it, is prohibited.

General Prohibitions

Fishing in limits leased to another is prohibited, providing that, in waters leased for net-fishing, bait for codfishing may be taken, and angling for other purposes than for trade and commerce is allowed.

Seines or nets must not be so placed as to obstruct navigation, and boats must not wantonly injure or destroy fishing gear.

Stakes or timber used for placing nets shall be removed 48 hours after they have ceased to be used.

Main channels of streams shall not be obstructed by nets or any other fishing apparatus, and in every tidal stream at least two-thirds of the main channel at low tide shall be left open.

But eel weirs and mill-dams for catching eels shall be prohibited only when they interfere with other fisheries.

Killing fish passing through a fishway is prohibited.

The following nets are forbidden except on special license for deep-sea fish other than salmon: bag-net, trap-net, fish-pound.

No person (Indians having a special permit excepted) shall use spears, grapnel-hooks, negogs, or nishagans to catch salmon, trout, lunge, maskinonge, winaniche, bass, barfish, pickerel, whitefish, herring or shad.

The catching or selling of the young of any fish is prohibited.

Seines for barfish shall have meshes of not less than 3 in. extension measure.

The distance between fisheries is to be regulated by fishery officers.

Box-traps in fascine fishery shall have across their ends a wire net, the meshes of which shall be at least 1 in. square.

Explosives and projectiles for taking fish of any kind are prohibited except for whales, porpoises and walruses.

No weir, net or fascine shall be so placed as to unduly obstruct the passage of fish.

Injury to Fishing Grounds and Pollution of Rivers

In any water where fishing is carried on, no one shall throw overboard any ballast, coal ashes, stones or other deleterious substance, nor leave or deposit on the beach of any tidal estuary between high and low water mark or within 200 yds. of the mouth of any salmon river, any offal or decaying fish.

No person shall knowingly cause or permit any lime, poisonous drugs or chemicals, mill rubbish or sawdust to be put in any water frequented by fish.

Fisheries officers shall have all the powers and immunities of justices of the peace.

Miscellaneous

The Minister may lease or set apart waters for artificial propagation of fish.

Leases or licenses for oyster beds may be issued for any term of years.

From 6 p.m. Saturday to 6 a.m. Monday all sedentary fishing stations, nets, seines, etc., shall be so fixed as to admit of the free passage of fish without danger of capture in non-tidal waters, and in tidal waters from the time of low water nearest 6 p.m. Saturday to the time of lowest water nearest 6 a.m. Monday.

In British Columbia, Manitoba, Alberta and Saskatchewan, all ditches or canals for irrigation or other purposes shall have over their entrances fish-guards or nets to prevent the passage of fish.

General Dominion Fishery Regulations[a]

Anglers' Permits

Foreigners wishing to angle for sporting fish in any of the inland waters of Canada must obtain from the Dominion authorities a permit costing $5.

Exceptions: In Ontario, Quebec, New Brunswick and Prince Edward Island these permits are issued by the provincial authorities.

Such permit allows a fishing line having not more than 3 hooks, to be used.

Size limit of fish for anglers:

Trout, 6 inches.
Salmon and Grilse, 3 lbs.

Anglers holding these permits may not sell fish caught with hook and line.

Soft-Shell Clams

Close season for export:

Quebec, Nova Scotia, New Brunswick, Prince Edward Island, May 1 to June 30.[b]

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a Where not otherwise specified, these regulations are taken from the Order in Council of 12th September, 1907.

b Order in Council, Aug. 1, 1910.

Export of Trout Speckled, river or sea trout taken in Ontario, Quebec, New Brunswick, and Prince Edward Island, are not to be exported from Canada; provided that 25 lbs. of such fish may be exported if accompanied by copy of the angler's permit or certificate from local fishery officer or station agent.

Lobster Fishery Close seasons and size limits:[a]

For Charlotte and St. John counties, New Brunswick, June 30 to Jan. 5 inclusive; size limit, 4¾ inches.

For the county of Albert, New Brunswick, and the counties of Kings and Annapolis, Nova Scotia, June 30 to Jan. 14, inclusive.

For the county of Digby, Nova Scotia, June 16 to Jan. 5 at nine o'clock a.m.

For Nova Scotia from Yarmouth to Halifax counties, May 31 to Dec. 14.

For Nova Scotia from Halifax harbour to Red point, Cape Breton Island, July 1 to Mar. 31.

For Cape Breton Island from Red point to and around cape North and including cape St. Lawrence; also for the north shore of the gulf of St. Lawrence from and including the bay of Blanc Sablon westward to the head of tide, including the island of Anticosti: Aug. 1 to Apr. 30, inclusive.

For Magdalen islands, July 11 to Aug. 31, inclusive. But no one shall fish for lobsters at any time in the lagoons of these islands.

For a portion of Northumberland strait, Aug. 11 to May 24, inclusive.

For Prince Edward Island, except that portion of the coast extending from West point around the west, north and that portion of the south coast of the Province to cape Traverse: July 11 to Apr. 25, inclusive.

Places not otherwise specified, July 11 to Apr. 19, inclusive.

Except as otherwise provided, the size limit for lobsters shall not be less than 8 inches.

General Prohibitions Berried or soft-shell lobsters must not be caught, or if caught, must be at once liberated alive.

Lobster traps are not allowed in water of the depth of 2 fathoms or less.

Lobster fishing gear shall not be set before 6 o'clock on the first day of the open season except as otherwise provided above.

Trawl lobster fishing is prohibited in Gaspe and Bonaventure counties.

No one shall purposely sell or purchase any broken up lobsters for canning purposes.

Lobster fishing gear shall not be set less than 100 yards from any stationary salmon net.

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a Order in Council, Sept. 30, 1910.

No one shall boil lobsters on any ship or floating structure except under special license from the Minister.

All lobster traps constructed after Dec. 31, 1910, shall have the laths on them not less than 1¼ in. apart and all netting used in said traps shall have meshes not less than 3 inches extension measurement; and no one shall fish after the said date with traps not constructed in accordance with these requirements. All lobster traps constructed before Dec. 31, 1910, may be used without being remodelled till Dec. 31, 1912, the burden of proof as to when such traps were constructed to rest on the person using them[a].

Oyster Fishing

Licenses are required from the Minister of Marine and Fisheries.

Close season: Apr. 1 to Sept. 30.

Size limit:

Round oysters, 3 in. in diameter of outer shell.
Long oysters, 3½ in. in diameter of outer shell.

A permit may be obtained to catch small oysters for planting beds.

Prohibitions:

(a) Sunday fishing; ice fishing; night fishing.
(b) Digging for mussel mud within 200 yards of live oyster bed.
(c) Digging for mussel mud—
  (i) in portion of Trout river, Prince Edward Island.
  (ii) in portion of Bedford river, Prince Edward Island.
(d) Use of rakes on beds prepared or planted by Department of Marine and Fisheries.
(e) Quahaug rakes, purchase power tongs and tongs other than those now in use in Prince Edward Island and New Brunswick.

Oyster reserves for artificial propagation:

1. Portion of York river, P.E.I.
2. Big Tracadie harbour, N.S.
3. Portion of Shediac harbour, N.B.

Quahaugs or Hard-Shell Clams

Licenses are required.
Open season: May, June and September.
Size limit: 2 in. in length.

Prohibitions:

(a) Rakes with teeth less than 2 in. apart.
(b) Fishing for clams on oyster areas, except where permitted by fishery officer.

[a] Order in Council, Dec. 13, 1910.

Special Dominion Regulations[a]

The following are special regulations promulgated from time to time by Order in Council, and apply to the fisheries in the various provinces of Canada.

Nova Scotia The Minister may authorize the taking of bait for deep-sea fishing during weekly close time.

Close season for bass: Mar. 1 to Oct. 1, but hook and line angling is allowed at all times. Size limit: 2 lbs.

Cod No fishing is allowed with seines within half a mile of where hook and line fishing is going on from boats.

Herrings Net and seine fishing prohibited within 600 ft. of herring spawning grounds from June 25 to Aug. 25.

"Driving" with artificial light is forbidden.

Salmon Close season: August 15 to March 1; but fly-fishing is permitted between Feb. 1 and Aug. 15 except in Cape Breton Island, where such fishing may be permitted from June 1 to Sept. 26.

In tidal waters, salmon fishing is not allowed from 6 p.m., Saturday, to 6 a.m., Monday; except in the estuary of Medway river, where the close time shall be from 6 p.m., Friday, to 6 a.m., Monday.

In non-tidal waters, 9 a.m., Saturday to 6 a.m., Monday.

Dams shall not be used with respect to the regulation of their discharge in order to facilitate the catching of salmon.

Shad and Gaspereaux Close time:

Sunset Friday, to sunrise Monday.

Smelts Close season: April 1 to July 1.

Seines are prohibited, also bag or gill-nets with meshes less than 1½ in.

Bag-nets are prohibited except on special license from the Minister, when they may be used from Dec. 1 to Feb. 15.

Gill-nets are prohibited except on special license from the Minister, when they may be used from Nov. 1 to Feb. 15.

The use of drift-nets is prohibited for catching sturgeon.

Trout and Land-Locked Salmon Close season: Oct. 1 to Mar. 31.

Only fishing with hook and line is allowed.

Ice fishing for speckled trout is prohibited.

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[a] These regulations, except as otherwise specified, have been summarized from the Order in Council of Sept. 12, 1907.

On special permit from the Minister, trout may be caught for domestic use ten days after the expiry of the legal close season. Fee: 50c.

The export of trout is prohibited, except the usual 25 lbs. allowed each licensed angler.

Seines are not to be set within 100 fathoms of any licensed weir, trap or net.

In addition to these regulations, each fishing county in the Province has detailed local regulations governing fishing within its bounds.

New Brunswick Licenses to take bait (during the weekly close time period) for the *bona fide* purpose of deep-sea fishing may be procured on the authorization of the Minister of Marine and Fisheries.

Bass Striped,–close season: April 1 to Nov. 30.

Striped,–weight limit: 2 lbs. Anglers may take bass exceeding 2 lbs. in weight.

Fishing apparatus allowed:

Gill-nets (in Sept. only) having a mesh of over 5 in. extension measure.[a]

Only licensed nets; license fee, $1.

No fishing for cod with seines is allowed at less than half a mile from where fishermen are using hooks and lines from boats.

Herrings No nets are allowed where herrings resort to spawn between June 25 and Aug. 25, nor within 1,000 feet of any licensed weir.

Flambeau or torch fishing is prohibited.

Licenses are required for weirs, engines or barricades used to catch herrings.

Salmon Close seasons:

Aug. 15 to Mar. 1.

For fly fishing: Aug. 15 to Feb. 1.

In tidal waters: 6 p.m., Saturday, to 6 a.m., Monday.

In non-tidal waters: 9 p.m., Saturday, to 6 a.m., Monday.

Nets must be licensed at 3c. a fathom per annum. Owner's name must be on nets.

On payment of a fee of $1, a license may be issued to riparian settlers (British subjects) on a portion of the river St. John, permitting salmon fishing with 30-fathom nets each alternate fortnight from May 1 to Aug. 15.[b]

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a Order in Council, Aug. 26, 1908

b Order in Council, June 5, 1908.

Shad and Gaspereaux

Close time:

Sunset, Friday evening, to sunrise, Monday. In the St., John river and its estuaries: 6 p.m., Saturday, to sunrise Monday.

After June 30 in each year these fish may not be caught.

Seines are prohibited for catching these fish.

Smelts

Close season:

Mar. 1 to June 30.

Prohibited gear:

Seines.

Bag-nets with meshes less than 1¼ in.

All bag-nets, except those used under license between Dec. 1 and Feb. 15.

Electric or other lights in connection with bag-net fishing.

Permits are granted only to resident British subjects on payment of a fee of $15.

Close season: June 1 to July 1.

Gear allowed: Nets with not less than 13 in. mesh.

Size limit: 4 ft. in length.

Sturgeon

Close season:

June 1 to July 1, inclusive.

Net fishing for sturgeon must be licensed by the Minister. The minimum size of meshes of nets shall be not less than 13 inches, extension measure.

Net licenses shall be issued only to *bona fide* resident British subjects on payment of a fee of $15.

Size limit for sturgeon: 4 feet.

Close season: Oct. 1 to Mar. 31.

Trout and Land-Locked Salmon

Prohibitions:

(a) All means of capture except hook and line.

(b) Ice fishing in all Canada.

Permits are granted to fish for trout to be used for domestic purposes, ten days after the close season.

Export of all speckled river and sea trout is prohibited, except 25 lbs., which must be accompanied by the fishery officer's or station agent's certificate.

Whitefish

Close season: Oct. 1 to Dec. 31.

Voluminous special regulations apply to local fishing in the various counties of New Brunswick.

Prince Edward Island

Permits to take bait during the weekly close time, such bait to be used for the *bona fide* purpose of deep-sea fishing, may be issued on the authorization of the Minister.

Cod

Cod fishing shall not be carried on with seines at a less distance than one-half mile from any fishing ground where boat fishing is going on.

Eels

Fishing for eels with torches is prohibited in salmon and trout waters during October, November and December.

Herring

No seines or nets are allowed within 600 ft. of a herring spawning resort between June 25 and August 25.

No seines or nets are allowed within 600 ft. of any licensed weir or trap-net.

"Driving" for herring with artificial light is prohibited.

Smelts

Close season: April 1 to July 1.

Seines are prohibited.

Bag nets must have meshes of not less than 1¼ in.

Gill-nets may be used only under special license from the Minister and then only from October 1 to March. 31.

Bag-nets may be used only under special license from the Minister, and then only from November 1 to February 15.

Fee $1.00; minimum sized mesh, 1¼ inches.

Trout

Close season: October 1 to March 31.

Only hook and line is allowed for catching trout.

Ice fishing for speckled trout is prohibited.

Trout may be caught, under special permit, for domestic purposes for ten days after the close of the close season.

The fee for each such permit is 50c.

The exportation of speckled, river or sea trout is prohibited except the 25 lbs. allowed each licensed angler.

Quebec

The Minister may issue permits for taking deep-sea fishing bait during the prescribed weekly close time.

Bass

Close time: Apr. 1 to June 15.

Size limit: Black bass, 9 inches.
Rock bass, 6 inches.

Gear allowed: Only hook and line.

Cod

Fishing with seines is not allowed within half a mile of where hook and line fishing is going on.

Cod fishing in gulf of St. Lawrence (Quebec):

Licenses are required for trap-net fishing, except at a distance of 1,000 yards from shore, or from any similar net set from the shore.

Cod traps are not to be set at mouths of rivers frequented by salmon.

Trap-nets are to be 250 yards apart, or farther, if so directed by the fishery officer.

If the leader of any trap-net extends from the shore any fishery officer may determine, in writing or orally, the length of leader to be used.

Size of trap-net mesh allowed: pot, 4 inches; leader, 6 inches.

Fee for trap-net license: 50c for each fathom in leader.

Jiggers are prohibited.

Inhabitants of the United States fishing with trap-nets in Canadian waters may, in the exercise of their rights under the Treaty of 1818, be granted a license, subject to compliance with the usual rules and regulations.[a]

Deep-Sea Fisheries—Magdalen Is.

From May 1 to June 15, it is unlawful to set herring and mackerel nets opposite Amherst harbour, the middle of Sandy Hook channel or the northern and western shores of Entry island at more than one mile from shore; provided, however, that nets may be set from Allright and Grindstone islands toward Entry island to within one-half mile of those set upon the north and west shores of said island. Nets in bays are not to be set closer than 10 feet.

Set lines and bultow lines for cod or halibut are prohibited in Pleasant bay.

Eels

Maximum size mesh of net or trap: 1½ in. bar measure. No leader of an eel trap or weir shall exceed the height of the pot of said trap or weir.

Size limit: 30 inches.

Herring

Trap-nets: Fishing with trap-nets without a license is prohibited in the gulf of St. Lawrence, except at a distance of 1,000 yards from the shore, or from any similar net set from the shore.[b]

Trap-nets are not to be set near the mouth of any river frequented by salmon.

Trap-nets are to be placed at least one-eighth of a mile apart unless a longer distance is required by the fisheries officer.

[a] Order in Council, Jan. 21, 1911.
[b] Order in Council, Jan. 21, 1911.

If the leader of a trap-net extends from the shore, any fishery officer may determine, orally or in writing, the length of the leader that may be used.

Fee: 50c per fathom of leader.

Seines are prohibited on the north shore of the St. Lawrence in the county of Saguenay from Kegashka to cape Whittle.

The same privileges are accorded inhabitants of the United States under the Treaty of 1818 as in the case of fishing for cod.

Maskinonge Close season: Apr. 15 to June 15.
Size limit: 24 inches.

Ouananiche Close season: Oct. 1 to Nov. 30.
Seines and nets are prohibited.

Pickerel Close season: Apr. 15 to May 15.
Size limit: 15 inches.

Net Fishing Net fishing is prohibited in Iroquois river and in the lakes and tributary streams thereof in the counties of Missisquoi, (except Missisquoi bay), Shefford, Brome, Drummond, Richmond, Wolfe, Sherbrooke, Stanstead, Compton, Megantic and Beauce.

Night lines in a prohibited district must not have more than 100 hooks on each.

Net fishing is prohibited in Two Mountains, St. Francis and St. Louis lakes, including Caughanawaga, Chateauguay, Jesus and des Prairies rivers and the outlets of the Ottawa.

Fishing with seines and nets is prohibited during July and August in the St. Lawrence river from the eastern boundaries of Champlain and Nicolet to the international boundary line. This also includes tributaries in the said district.

Propagation of Fish Reserves:

(1) North, Salmon, Magog, Massawippi rivers, tributary streams of L. Massawippi and portions of Negro and Tomifobia rivers. Hook and line fishing is allowed in these streams from May 14 to Oct. 10.

(2) Brome lake from May 1 to June 15. During the open season only fishing with hook and line and trolling with a spoon are allowed.

(3) Portions of Rivière du Sud, Escoumains, Patapidia, Kedgwick rivers, Mowat lake and the Government salmon fishing stations of Tadoussac.

Salmon Close season: (1) July 31 to May 1; but fly-fishing is allowed from Feb. 1 to Aug. 15.

Fly fishing is permitted from Feb. 1 to Aug. 31, along the north shore of the gulf of St. Lawrence east of Natashkwan, Rimouski, Murray, du Gouffre and Jacques-Cartier rivers.

(2) No fishing is allowed in tidal waters from 6 p.m. Saturday to 6 a.m. Monday.

Smelts Close season: Apr. 1 to June 30.

Nets: Bag-nets with meshes less than 1¼ inches are prohibited. Bag-nets must be licensed and may be used only from Dec. 1 to Feb. 15.

Seines are prohibited.

Exceptions:

(a) Gaspe county and those portions of Bonaventure county without railway communication, in which places seining is allowed from Oct. 1 to the close of navigation.

(b) Bag-net fishing is prohibited within the above limits.

(c) Under special permits, seining is allowed on the coast of Saguenay county from Bersimis to Natashkwan, from Oct. 1 till the close of navigation.

Sturgeon Bare hooks, grapnels and spears are prohibited.

Close season: June 1 to 30.

Size limit: 36 inches.

Trout Close season:

Grey or lake trout and land-locked salmon, October 15 to Dec. 1.

For speckled trout, Oct. 1 to Apr. 30; except in tidal waters on the north shore of the river St. Lawrence from Saguenay river to Blanc Sablon, no one shall catch trout by other means than hook and line.

Ice-fishing for speckled trout is prohibited.

No export is allowed of speckled river or sea trout, except the 25 lb. permitted by law.

Whitefish Close season: Nov. 10 to Dec. 1.

Ontario BASS.—Close season: Apr. 15 to June 15.

Exceptions: in western lake Erie the close season is from May 25 to July 15.

Minimum day's catch: 8 small-mouthed or large-mouthed black bass.

Minimum size: 10 inches.

Sale or export is prohibited for five years from May 30th, 1909, except the catch of two days' fishing, which is allowed to licensed anglers.[a]

Leases or licenses are required for fishing in the Province with nets or other apparatus.

Maskinonge Close season: April 15 to June 15.
Maximum day's catch: four.
Size limit: 24 inches.

Sale and export prohibited for five years from May 30, 1909, except the two days' catch allowed to a licensed angler.[a]

Pickerel Close season: April 15 to May 15, but the close season is abolished in Lambton county, on the shores of lake Huron and St. Clair river.

Maximum day's catch: twelve.

Size limit: 15 inches.

Bay of Quinte Restriction Fishing is prohibited between Green bay and Deseronto during June, July and August.

Speckled Trout Close season: September 15 to April 30.
Maximum day's catch: thirty.

Maximum weight of day's catch: 10 lbs.

Size limit: 6 inches.

Sale and export is prohibited for five years from May 30, 1909, but two days' catch may be taken out of the country by a licensed angler.[a]

The use of snares for fishing is prohibited in the Province.

Whitefish and Salmon Trout Close season: Nov. 1 to 30; but this close season is abolished in lake Erie bordering on the counties of Haldimand, Monck, Kent and Essex and around Pelee island, as well as in the Detroit river and lake St. Clair, bordering on the counties of Essex and Kent.

Fish culture Salmon Reserves:

Portions of the waters of
(a) Credit river.
(b) Highland creek.
(c) Lyons creek.
(d) Barber creek.

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a Order in Council of Feb. 16, 1909.

General reserves:(1)

Portions of the waters of

(a) Grand river, near Galt.
(b) Trent river.
(c) Grafton creek.
(d) Baldwins creek.
(e) Duffins creek.
(f) Rouge river.
(g) Burlington bay (Kerrs pond).
(h) Little lake, in lake St. Clair.
(i) Clear lake, Salmon-Trout lake with tributaries, Stony lake, Jack and Eel creeks.
(j) Georgian bay, from Grondine point to and including the mouth of the French river and extending into the bay four miles from the shore line.[a]

Manitoba and Keewatin[b]

A license from the Minister is required of all persons fishing with nets or other apparatus. Such licenses are granted only to British subjects resident in Manitoba or Keewatin, or to Canadian firms with headquarters there.

Any resident settler or Indian may secure a free annual fishing permit allowing the use of not more than 100 yards of gill-net for domestic use; but such licenses must not be sold or bartered. Neither shall any license be transferable without the written permission of the local inspector of fisheries.

Only licensees may operate gill-nets.

Gill-nets and baited hooks are the only apparatus allowed.

Anglers permits are issued as under the general regulations.

Fishing in Lake Winnipeg

SUMMER FISHING.—The summer fishing season, when fishing may be carried on under tug, sail-boat or skiff licenses only, extends from June 1 to Aug. 15, inclusive.

Licenses:

(a) A tug license costs $50 and allows the use of not more than 5,000 yards of gill-net.
(b) A sailboat license costs $10 and allows the use of not more than 3,000 yards of gill-net.
(c) A skiff license costs $5 and allows the use of not more than 1,500 yards of gill-net.

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a Order in Council of Feb. 16, 1909. This reserve is set apart for securing an adequate supply of fish eggs for artificial breeding purposes.

b Order in Council of May 1, 1911. Previous to this date, one set of regulations applied to Manitoba, Saskatchewan, Alberta, the North West Territories and the Yukon. As a result of the forthcoming findings of the Alberta and Saskatchewan Fisheries Commission, a new set of regulations for the Western provinces, other than Manitoba, will doubtless be formulated.

The mesh of such nets shall be, till June 1, 1913, not less than 5¼ inches, extension measure; thereafter, till June 1, 1915, not less than 5½ inches; and thereafter not less than 5¾ inches.

LIMITATION OF WHITEFISH CATCH.—During the summer commercial season not more than 2,500,000 lbs. of dressed whitefish shall be caught.

A sturgeon gill-net license for summer fishing costs $3 and allows the use of not more than 300 yards of net, the mesh of which shall not be less than 14 inches, extension measure.

A cat-fish gill-net license costs $3 and allows the use of not more than 1,500 yards of net, of not less than 5½ inches mesh, extension measure.

WINTER FISHING.—Gill-net season: Nov. 20 to Apr. 30, inclusive.

Whitefish gill-net licenses cost $5 and allow the use of not more than 1,500 yards of net. The mesh of this net shall not be less than 5¼ inches, extension measure, until Mar. 1, 1913; thereafter, until Mar. 1, 1915, 5½ inches; and after that date 5¾ inches.

Pickerel gill-nets: Fee, $5.
Length of net allowed, 1,500 yards.
Minimum size of mesh, 4¼ inches.

Tullibee, goldeye or jackfish licenses:
Fee, $5.
Length of net allowed, 1,500 yards.
Minimum size of mesh, 4 inches.

FALL FISHING.—Gill-nets are allowed from Sept. 1 to Oct. 15, inclusive for 1911 only. Thereafter, no fall fishing shall be permitted.
Pickerel gill-net license: Fee, $3.
Length of net allowed 1,500 yards.
Minimum size of mesh, 4 inches, extension measure.

Red River Drag-seines are allowed only in 1911, and then only from July 20 to Aug. 31, inclusive. Drag-seine licenses cost $25 and allow the use of not more than 66 yards of net, having a minimum sized mesh of 3 inches, extension measure.

Jackfish or grass-pike license:
Fee, $2.
Allows fishing from Nov. 20 to last day of February inclusive.
Length of net allowed, 500 yards.
Minimum size of mesh, 3¾ inches, extension measure.

Lakes Winnipegosis and Waterhen Gill-nets are permitted for winter fishing from Nov. 20 to the last day of February, inclusive.

Whitefish gill-net license:

Fee, $5.

Length of net allowed, 1,500 yards.

Minimum size of mesh, the same as for lake Winnipeg, as stated above.

Pickerel gill-net license:

Fee, $5.

Length of net allowed, 1,500 yards.

Minimum size of mesh, 4¼ inches, extension measure.

Jackfish gill-net license:

Fee, $5.

Length of net allowed, 1,500 yards.

Minimum size of mesh, 4 inches, extension measure.

In Dawson bay and in lake Winnipegosis north of a line drawn east and west from the north end of Birch island, no nets less than 5¼ inches, extension measure, shall be allowed.

Lake Manitoba

Gill-nets are allowed for winter fishing from Nov. 20 to the last day of February, inclusive.

The regulations concerning the use of pickerel and jackfish gill-nets are the same as for lakes Winnipegosis and Waterhen.

In lake Dauphin the regulations applying to the use of gill-nets for winter fishing and to jackfish gill-nets are the same as for lake Manitoba.

Lac du Bonnet

Sturgeon gill-net and baited hook licenses cost $5, and allow the use of not more than 200 yards of net and 200 baited hooks. The mesh shall not be less than 11 inches, extension measure.

A license costing $2 may be issued to authorize the use of not more than 200 baited hooks for any part of Manitoba or Keewatin.

Close seasons:

Pickerel, goldeyes, pike and jackfish: Apr. 15 to June 20, inclusive.

Whitefish and trout: Sept. 15 to Nov. 19, inclusive.

Sturgeon: May 15 to June 15, inclusive.

Seines, nets and other apparatus shall be so fixed as to allow the free passage of fish from 6 p.m. Saturday to 6 a.m. Monday.

So far as apparatus, close seasons, length and mesh of nets and license fees are concerned the regulations applying to the different fisheries of lake Winnipeg shall apply also to those in Keewatin district.

Prohibitions

The following prohibitions are established:

Fishing for sale or commercial purposes from 1911 to 1913 in Shoal, St. Martin, Pine island and Playgreen lakes.

Fishing in lakes Winnipegosis, Manitoba and Dauphin from Mar. 1 to Nov. 19, inclusive.

Pound-nets, trap-nets and bare unbaited hooks or grapnels.

Drag-seines after Aug. 31, 1911.

Only angling is allowed within 500 yards from the entrance piers at the lower end of the lock and the upper end of the lock canal at St. Andrews rapids.

Summer commercial fishing in portions of lake Winnipeg and its tributary waters.

Pickerel nets north of a line drawn from Flour point to Wicked point.

A portion of lake Winnipeg is set aside for hatchery purposes.

British Columbia[a] Abalone:

Size limit, 4 in. across shortest diameter of shell.

Close season, the year 1911, and every third year thereafter.

Fee for license, $10

Clams License fee: $2.

Crabs Size limit, 6 in. long diameter.

Fee, $2.50.

Export of Fish Export to foreign countries of fresh clams and other edible shellfish (but not oysters) is prohibited.

The export of sockeye salmon is prohibited unless they are in a frozen, canned, salted, smoked or cured condition.

The export is prohibited of fresh herring from British Columbia, or of herrings salted for less than nine days, or of herring intended for curing, canning or making oil or fertilizer outside of Canada.

But fresh herring taken in gill-nets may be exported in a fresh unsalted condition for immediate consumption.

Fraser River Channel No net shall be allowed to drift on the channel side of the river within 100 yards of the line of buoys between the lightship at the head of Sandheads and Stevenson. In other portions of the channel, nets must be hauled in to let steamers pass.

Herring or Pilchard Close season: Mar. 1, to Apr. 30. The season may commence at an earlier date at the discretion of the fishery officer in the locality.

Nets: Only gill-nets, drift-nets and drag-nets are allowed. Drift or gill-nets are not to exceed 200 fathoms in length.

Minimum size of mesh, 2½ in.

Fee for drift or gill-net, $2.50.

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a Order in Council of Mar. 12, 1910.

Drag-seines are not to exceed 100 fathoms in length, and the mesh shall be not less than 1 in. in diameter.

Fee for drag-seine, $50.

Halibut Close season: Mar. 1 to 31.

Leases or Licenses Licenses are required for fishing with nets or other apparatus and also for taking shell-fish.

Licenses are granted only to British citizens resident in British Columbia or to Canadian companies licensed to do business in British Columbia.

Licensees must make return of catch to fishery officer.

Gill and drift-net licenses can be transferred only with the fishery officer's permission; all other licenses only with approval of the Minister.

Indians, with the fishery officer's permission, may fish anywhere at any time to obtain fish for their own food. But they must not spear, trap or pen fish on the spawning grounds or in reserves set apart for fish culture.

Salmon canneries and curing establishments must have a license. Fee: $50.

These licenses are conditional on the favourable report of the Fishery Inspector respecting the sanitary condition of the establishment.

Marking Boats and Nets Each net and boat must be marked with its license number and each boat also with its owner's initials.

Other Fish The fee for a license for catching other fish than those named in the Regulations shall be $1.

Oysters Fee for license to fish on natural areas: $2.50. Fee for license covering a term of years, $2 per acre per year.

Close period: May to August inclusive.

Prohibitions

1. Salmon gill or drift-nets cast from a boat nearer than 100 yards from one already in the water.
2. Sunk-salmon nets and diver salmon nets.
3. More than one net operating under one license.
4. The use of a gill-net by anyone other than the licensee.
5. Salmon gill-net licensees fishing in a district other than the one for which their license was granted, unless the endorsation of the second fishery officer is obtained.
6. Nets enclosing any bay, cove, creek or inlet. At least one-third of the width of such indentation must remain open.

7. The use of salmon purse-seines in any harbour or area specified by the district inspector of fisheries.

8. A greater length of net by any fishing boat than is permitted by the license thereof.

9. The use of nets for taking fish in all the fresh water lakes or non-tidal waters of British Columbia.

10. Use of bare, unbaited hooks or grapnels for sturgeon.

11. Introduction of non-indigenous or non-native fish into British Columbia waters, except by permission of the Minister.

Prohibited Areas Net fishing is prohibited in:

(a) A portion of Victoria harbour.

(b) Nanaimo harbour and Departure bay, except herring gill-nets; provided that in Departure bay, drag-seines may be used if operations are suspended between 7.30 a.m. and 5 p.m. and a weekly close time from 5 p.m., Saturday, to 7.30 a.m., Monday, is observed.

Smelt and Sardine License fee: $1.

Nets allowed: Gill and drift.

Salmon Nets allowed: Drift or gill; drag-seines, purse-seines, trap-nets.

Size of nets: 150 fathoms long and 60 meshes in breadth; 7 in. mesh.

For sockeye salmon, 5¾ in. mesh is allowed. But north of the 51st parallel of north lattitude, salmon drift or gill-nets of 200 fathoms length and 50 meshes breadth may be used.

Fee for salmon gill-net or drift-net license: $5.00.

Drag seines shall not exceed 300 fathoms in length and the mesh shall be 3 in. Fee for same: $25.

Purse-seines shall not exceed 500 fathoms in length; mesh to be 3 in. No license for same shall be issued for any harbour or reserved area. Fee: $50.

Trap-net: Must be located on definite site and at least 400 fathoms from nearest adjacent trap. Meshes are to be not less than 6 in. leader and 2 in. heart. Fee: $75.

Only resident British Columbia subjects are allowed to fish for sockeye salmon in the Fraser river from New Westminster bridge to Mission bridge. Close season for salmon:

For sockeyes, Oct. 1 to June 30.

Exceptions: North of 51st parallel of north latitude, where close season shall be from Oct. 1 to June 19; and during such season no salmon, gill or drift-nets of less than 7 in. mesh shall be used. But

no nets are to be used at all in the Fraser river from Point Grey to the 49th parallel of north latitude from Aug. 25 to Sept. 15.

For spring salmon or quinnat, Oct. 1 to Nov. 15.

For coho, dog or humpback salmon, Nov. 15 to Jan. 1.

Size limit for net fishing: 3 lbs.

Steelheads

Close Season:
Non-tidal waters, Nov. 15 to Mar. 25.
Tidal waters, Jan. 1 to Mar. 25.

Sturgeon

Only gill-nets and drift-nets are allowed for capturing sturgeon. These are not to be more than 150 fathoms long and are to have meshes not less than 12 in. in diameter.

Fee: $2.50.

Close season: Nov. 15 to March 25.

Exception; The interior portion of the Province east of the 120th meridian, where the close season is from Nov. 15 to April 30.

Size limit: 8 inches in length; 3 lbs. weight.

Ice fishing is prohibited.

Tidal boundaries are defined in detail in the Regulations.

Trout

Close season: Nov. 15 to Mar. 25.

Exception: The waters of the interior portion of the Province east of the 120th meridian, where the close season is from Nov. 15 to Apr. 30.

Size limit: 8 inches in length and 3 lbs. in weight.

Fishing through the ice for trout is prohibited.

Weekly Close Time

The weekly close time for salmon fishing varies with the different districts into which the Province is divided for this purpose, as follows:—

South of 51st parallel of north latitude: Friday, midnight to 6 p.m. Sunday. Traps west of Gonzales point are exempted. In "off" years—1910, 1911, 1912, 1914, *et al*—this close time shall be six hours longer.

North of 51st parallel of north latitude: 6 a.m., Saturday, to 6 p.m Sunday.

West of Gonzales point: 6 p.m., Friday, to 6 a.m., Sunday.

Provincial Fishery Laws[a]

New Brunswick

The Commissioner of Fisheries may authorize the setting apart of reserves for artificial propagation, and the same shall be protected from trespass by a fine of $100.

The Lieutenant-Governor in Council may grant leases to take fish from these reserves for stocking purposes.

The Surveyor General may issue fishery leases or licenses for fishing in provincial waters under the control of the Province.

Leases authorizing fishing with hook and line shall not be for longer than ten years, and if in the Restigouche river, five years; and such lease shall go to the highest bidder.

Except in cases of leases for fly fishing, the rental shall be fixed by the Surveyor General and paid in advance.

The Commissioner's written consent is necessary for transferring a lease or license.

The Surveyor General, with or without the request of the lessees, may appoint sufficient guardians to protect fishing rights. Every guardian so appointed shall be, for this purpose, an ex-officio provincial constable.

If so required by the Surveyor General, a lessee shall keep at his own expense, a guardian to protect the fisheries rights granted in his lease.

Every person enjoying an exclusive fly fishing lease shall keep one or more such guardians for such period as the Surveyor General may determine.

Lessees must transmit an annual report of their catch.

The Surveyor General may grant leases of waters adjoining Crown Lands that are not under lease, for a period not exceeding three months.

A lessee's conviction of violation of law acts as a cancellation of his lease.

Lessees are answerable for damage done to lands and timber on their leasehold.

Trespassers on property under fishery leases are liable to a fine of $1 to $10, with costs; and persons procuring or assisting in illegal fishing on such leased property shall be liable to a fine of from $5 to $20, with costs. Other penalties range from $5 to $50, with imprisonment in default of payment.

The Lieutenant-Governor in Council may appoint fishery overseers who are ex-officio justices of the peace.

Appropriate penalties are prescribed for violation of the fishery laws and regulations.

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a Nova Scotia has no provincial laws respecting fisheries—Letter of Deputy Provincial Secretary of Nova Scotia, Aug. 16, 1910.

Under a penalty not exceeding $25, all non-residents engaging in fly-fishing in provincial waters are required to secure, at a cost of $5, a license from the Surveyor General; but non-residents who are *bona fide* holders of leases are not required to pay for this license.

Any person found committing any offence against the Act, may be arrested by any overseer, guardian or peace officer and tried before an overseer or justice of the peace.

Any person may be a complainant and lay an information under the Act.

Prince Edward Island [a]

An angler's permit is required, under a penalty of $20, of everyone fishing for salmon, trout or bass, who is not a permanent resident of the Province, or a son or a brother of a permanent resident.

Anglers' permits are granted by the Provincial Treasurer, the Game Inspector and the Tax Collectors, the fee being $2.

No person holding an angler's permit may kill in one day more than two salmon, twelve bass or twenty trout.

The export or sale of fish caught under authority of an angler's permit is prohibited under pain of a penalty of $10 and costs.

Hunting and fishing on enclosed property without the owner's consent is forbidden under a penalty of from $5 to $10.

Leases and Licenses

The Lieutenant-Governor in Council may issue grants in fee simple from the Crown to any person, persons or firm, of the beds of any river or lake or of any flats, beaches or foreshores. The Lieutenant-Governor in Council may issue fishery leases or licenses for fishing in provincial waters. These leases or licenses may not be sub-let without the permission of the Lieutenant-Governor in Council, or officer authorized by him to give such permission.

Occupants of lands adjoining lands included in fishing leases shall have the right of free passage over such leased lands.

The lessee, if required by the Lieutenant-Governor in Council, shall make a return of the number and weight of each species of fish caught. In case of failure to do this he is liable to forfeiture of his lease and also to a fine of from $10 to $100.

Licenses permitting fishing for two months in waters covering or adjoining Crown Lands may be issued by the Lieutenant-Governor in Council.

A fishery lease entitles the lessee to bring action in his own name against trespassers.

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[a] Fish and Game Act, 1906, with amendments of 1907, and the P.E.I. Fisheries Act

Penalties

Persons catching, selling, buying, or having in their possession any fish after the expiration of five days from the beginning of a close season are liable to a fine of from $10 to $30 and also to a fine of $1 for each fish caught or held in possession.

Persons other than lessees fishing on leased bottoms or inducing others to do so are liable to a fine of from $25 to $100.

Anyone destroying or injuring any place set apart or leased by the Lieutenant-Governor in Council for the artificial propagation of fish shall be liable to a fine not exceeding $100 and costs, or in default of same, to imprisonment.

Oysters may not be cultivated without a lease from the Crown, of the beds or foreshore on which cultivation shall take place.

The Lieutenant-Governor in Council may appoint fishery overseers to enforce the law.

Oyster Fisheries[a]

The Lieutenant-Governor in Council may cause surveys to be made of the beds or bottoms suitable for growing oysters and may lease the same to individuals desirous of obtaining a lease of the bottom in front of their own foreshore. The application for lease must be in writing and not more than five acres may be leased to one person under such terms and for such length of time as the Lieutenant-Governor in Council may consider proper in accordance with the Act.

The surveyor who makes the survey of the oyster bottoms prior to their being granted shall exclude all such bottoms previously appropriated by law and also all natural or live beds. In case of dispute as to what is a live or natural oyster bed, the matter shall be decided by the Lieutenant-Governor in Council.

Leases may not be granted for more than twenty years. Rental considerations are determined by the Lieutenant-Governor in Council.

On expiration of the lease, renewal may be granted for a period not exceeding ten years.

Any person or persons holding leases of barren bottoms may petition the government for special officers to protect their holdings and the government may appoint officers for that purpose, with the power of police officers, all costs incidental to such appointments being borne by the applicants.

No oyster licenses shall be issued for bottoms where mussel mud is dug nor where productive quahaug beds exist.

Licenses must be obtained by every boat and by every fisherman engaged in fishing for quahaugs—boat license fee, $20; fisherman's license fee, $20.

No quahaug license shall be issued for bottoms where live oyster beds exist.

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a Act respecting Oyster Fisheries.

Persons guilty of a violation of the provisions of the Oyster Fisheries Act shall be liable to a penalty not exceeding $50 and costs, or in default of payment, to imprisonment for a period not exceeding one month.

All leases must be registered in the county registry office.

Quebec

Licenses may be issued by the Minister of Colonization, Mines and Fisheries for a period not exceeding nine years. Leases for a longer time, but not exceeding fifteen years, may be issued by Order in Council.

The Minister may lease oi license, with the consent of the owner, any fishing rights pertaining to granted lands situate along provincial waters.

Leases in Non-navigable Waters

Crown lands granted since 1884 are subject to a fishing reserve of three chains bordering on provincial non-navigable waters.

The Minister may reduce the depth of this reserve in the case of islands and of lands of small extent.

The non-navigable portion of a partly navigable salmon river may be leased along with the navigable portion or by separate lease.

Leases of lands conferring fishing rights shall be made only in the name of one person or of an incorporated club.

Such leases give the lessee exclusive fishing privileges on the bordering waters.

Leases must make provision for right of passage for occupants of rear lands.

The Lieutenant-Governor in Council shall reserve in each new township one or more lakes or rivers in which residents of such townships may freely fish for domestic purposes only.

Each lessee shall appoint guardians to protect his fishery, and he is also responsible for damage done to timber on his leasehold.

Excessive or wasteful fishing during prohibited seasons shall involve the cancellation of the lease and another shall not be granted for five years.

Infringement of regulations shall also annul lease.

Lessees must make an annual return of the number and weight of fish caught on their territory.

Lessees shall indemnify previous lessees for permanent improvements made.

Licenses in Provincial Waters

A license confers exclusive fishing rights within the limits prescribed but does not preclude third parties from taking bait for cod or for angling for sport.

A fine not exceeding $100 and costs, may be imposed on those violating the privileges conferred on a licensee.

Disputes relative to claims, gear, etc., shall be settled by the local fishery officer subject to appeal to the Minister.

The local fishery officer shall prescribe the distances apart at which fishing gear shall be placed.

Salmon Fisheries Salmon fishing licenses shall not permit fishing within 500 yards of the mouth of a river where salmon go to spawn. The Minister may define the boundary of estuaries, and no salmon fishing may be allowed in such estuaries save on permit of the Lieutenant-Governor in Council.

Estuary maps shall be prepared by the Minister.

Oyster Beds Licenses for not longer than 15 years may be granted to persons wishing to plant oyster beds in provincial waters. The maximum fine for trespassing on same is $200 and costs.

Fish Culture Reserves Reserves for this purpose may be authorized by the Minister and trespassers on such are liable to a fine of $200 and costs. Fishermen may use vacant property accessory to public fishing rights.

Fishways Fishways, when required by the Minister, shall be built in obstructions placed in any provincial waters under a penalty of $4 a day for default.

Injury or destruction of fishways is prohibited under penalty of fine.

Fines and confiscations are provided for in the case of the violation of the provisions of this Act or the regulations adopted thereunder.

Persons dynamiting fish are liable to a penalty of from one to two years' imprisonment.

It shall be the duty of the Minister to provide a sufficient organization for the protection of the fisheries of the Province.

Every fishery overseer shall have the powers of a justice of the peace.

Open Seasons Salmon: May 1, to July 31.
Fly-fishing, Feb. 2 to Aug. 14.
Salmon trout: Dec. 1, to Oct. 14.
Ouananiche: Dec. 1, to Sept. 30.
Speckled trout: May 1 to Sept. 30.
Fishing through the ice is prohibited.
Gray trout (muskallunge), touladi (lake trout): Dec. 2, to Oct. 14.
Bass (not including sea bass or barfish): June 16 to March 31.

Eels may be caught in weirs and mill dams, but not so as to deprive other weirs of a share in the run. They may not be taken by spear or torch

during October and November in any waters frequented by salmon or trout.

Doré, May 16 to April 14 (fifteen inches).
Smelts, July 2 to March 31.
Sturgeon, July 1 to May 31.
Whitefish, Dec. 1 to Nov. 9.
Muskallunge, June 15 to April 14.

Ontario[a] The grant of the bed of any navigable water or of any lake or river shall not include the grant of exclusive fishing privileges unless such is specifically stated.

Special licenses are required for catching sturgeon and for taking spawn for breeding or scientific purposes.

Licenses are required of persons (including Indians and guides) fishing in lake Nipigon, Thunder bay district, Nipigon river, Nipigon district, and in the tributaries of said lake or river.

The Superintendent may authorize the lease of waters for fish culture.

Every net must be marked with the owner's name.

Fishing rights or licenses cannot be sub-let without the Superintendent's written consent.

A lease shall entitle the grantee to all rights of an owner in fee simple, but shall be subject to the right of free passage enjoyed by those holding land in the rear.

Possession, Sale and Transportation It is illegal to have in one's possession any fish during the close season. No hotel, restaurant or club shall supply fish during the close season unless under special permit; and it shall be considered an additional offense for any such establishment to supply such fish under any pretended name.

Transportation, cold storage, purveying and lumbering companies shall allow fisheries officers free access to their premises and books.

Common carriers and transportation companies or other persons shall not have in their possession for transporting, nor shall they transport, out of the Province any salmon trout, lake trout or whitefish weighing less than two lbs., or any fish caught in the Province at a time or in a manner prohibited by law.

Shipping packages must be so made as to show the contents, shall be marked with a description of the contents and must be labelled with the owner's name.

Licenses Licenses shall not be issued to any person, or to any corporation employing any person, who has been convicted of any offense against the Act within two years.

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a Ontario Statutes, 7 Ed. VII., chap. 49.

Licenses may be cancelled upon violation of the Act or the Regulations, and a conviction shall act as a cancellation.

Licenses may be issued for fishing in lake Nipigon, Nipigon river and adjacent waters on the following conditions:

(1) One license only to one person.

(2) Term of license must not exceed four weeks.

(3) Fees for non-residents of Canada–

$15 for two weeks or less.
$20 for three weeks or less.
$25 for four weeks or less.

(4) Fees for permanent residents of Canada—
$5 for two weeks.
$10 for four weeks.

(5) Licenses are non-transferable.

(6) Sanitary arrangements, disposal of refuse and regulations *re* extinction of fires shall be under the direction of an overseer.

(7) Cutting live timber is prohibited except for camp purposes.

Non-residents of the Province may obtain angling licenses for any waters, except those specially prohibited. These licenses are good for three months on payment of an individual fee of $2, or $5 per rod when those fishing live on their own yachts.

Licenses to guides may be issued at $2 each.

Administration Administration is under direction of the Superintendent of Game and Fisheries.

Not more than three fisheries inspectors shall be appointed; nor more than ten wardens.

These officials shall have the status of justices of the peace.

Deputy game and fishery wardens shall be appointed without salary except when on special service, and shall receive one-half of all fines resulting from conviction they secure.

Penalties are assigned by the Act for violation of laws and regulations.

Miscellaneous Regulations Family fishing permits were abolished by Order in Council of Jan. 8, 1909.

Residents of Ontario must obtain a license for fishing by other means than hook and line.[a]

Guides shall be responsible for the extinguishing of fires by parties employing them.[b]

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a Order in Council, May 3rd, 1907.
b Order in Council, July 1, 1909.

NORTH ATLANTIC FISHERIES DISPUTE

By James White

The decision of the Hague Tribunal, rendered Sept. 7, 1910, practically ended differences that have, for nearly a century, existed between Canada and Newfoundland, on the one hand, and the United States, on the other. Before discussing the award, it is necessary to state briefly the history of the dispute that was referred to the Tribunal.

Treaty of Paris, 1782

On Nov. 30, 1782, the provisional articles of the treaty of peace were signed at Paris by Richard Oswald on the part of Great Britain, and by John Adams, Benjamin Franklin and John Jay on the part of the United States. On September 3, 1783, the definitive treaty of peace, commonly known as the Treaty of Paris, was signed at Paris. Art. III of the latter is the same as Art. III of the provisional treaty, and reads as follows:

"It is agreed that the people of the United States shall continue to enjoy unmolested the right to take fish of every kind on the Grand Bank and on all the other banks of Newfoundland; also in the Gulph of St. Lawrence, and at all other places in the sea, where the inhabitants of both countries used at any time heretofore to fish; and also that the inhabitants of the United States shall have liberty to take fish of every kind on such part of the coast of Newfoundland as British fishermen shall use (but not to dry or cure the same on that island); and also on the coasts, bays and creeks of all other of his Britannic Majesty's dominions in America; and that the American fishermen shall have liberty to dry and cure fish in any of the unsettled bays, harbours and creeks of Nova Scotia, Magdalen Islands and Labrador, so long as the same shall remain unsettled; but so soon as the same or either of them shall be settled, it shall not be lawful for the said fishermen to dry or cure fish at such settlement, without a previous agreement for that purpose with the inhabitants, proprietors or possessors of the ground."

This article conceded:

(1) The *right* of the Americans to take fish on the "banks" of Newfoundland, in the Gulf of St. Lawrence and in the sea.

(2) The *liberty* to take fish on the coasts of Canada and Newfoundland.

(3) The *liberty* to dry and cure fish in the *unsettled* portions of the coasts of Canada and Newfoundland.

On Nov. 25th—five days before the treaty was signed—the British commissioners proposed that "the citizens of the United States shall have *the liberty* of taking fish of every kind on all the banks of Newfoundland and also in the Gulph of St. Lawrence; and also to dry and cure fish on the shores of the Isle of Sables and on the shores of any of the unsettled bays, harbours and creeks of the Magdalen Islands, in the Gulph of St. Lawrence, so long as such bays, harbours and creeks shall continue and remain unsettled; on condition that the citizens of the said United States do not exercise the fishery, but at the distance of three leagues from all the coast belonging to Great Britain, as well those of the continent as those of the islands situated in the Gulph of St. Lawrence. And as to what relates to the fishery on the coast of the Island of Cape Breton out of the said gulph, the citizens of the said United States shall not be permitted to exercise the said fishery, but at the distance of fifteen leagues from the coasts of the Island of Cape Breton."

This proposal was unacceptable to the United States commissioners, and Adams, who was specially charged with the care of negotiations respecting the fisheries, made a counter-proposal, which was virtually the same as the article incorporated in the treaty.

After the war of 1812–14, which was terminated by the Treaty of Ghent, the British Government maintained that as these 'liberties' were only privileges to be exercised in British waters and territories, they had been terminated by the war. When the negotiators met at Ghent, the British plenipotentiaries stated that "they felt it incumbent upon them to declare that the British Government did not deny the right of the Americans to fish generally or in the open seas; but the privileges formerly granted by treaty to the United States of fishing within the limits of British jurisdiction and of landing and drying fish on the shores of the British territories would not be renewed without an equivalent."

As a result of these differences, the treaty contained no mention of the fisheries.

In the following year an American fishing vessel was warned by the commander of H.M.S. *Jaseur* not to come within sixty miles of the British coast. Lord Bathurst disavowed this extreme claim, but stated that the Government of Great Britain "could not permit the vessels of the United States to fish within the creeks and close upon the shores of the British territories." Adams, then minister of the United States in London, contended that the Treaty of 1783 "was not, in its general provisions, one of those which by the common understanding and usage of civilized nations, is or can be considered as annulled by a subsequent war between the same parties."

Lord Bathurst replied:

"To a position of this novel nature Great Britain cannot accede.

She knows of no exception to the rule that all treaties are put an end to by a subsequent war between the same parties. . . . . The treaty of 1783, like many others, contained provisions of different characters—some in their own nature irrevocable, and others of a temporary nature. . . . . The nature of the liberty to fish within British limits, or to use British territory, is essentially different from the right of independence, in all that may reasonably be supposed to regard its intended duration. . . . . In the third article [of the treaty of 1782–83] Great Britain acknowledges the *right* of the United States to take fish on the banks of Newfoundland and other places, from which Great Britain has no right to exclude an independent nation. But they are to have the 'liberty' to cure and dry them in certain unsettled places within His Majesty's territory. If these liberties, thus granted, were to be as perpetual and independent as the rights previously recognized, it is difficult to conceive that the plenipotentiaries of the United States would have admitted a variation of language so adapted to produce a different impression; and, above all, that they should have admitted so strange a restriction of a perpetual and indefeasible right as that with which the article concludes, which leaves a right so practical and so beneficial as this is admitted to be, dependent on the will of British subjects, in their character of inhabitants, proprietors or possessors of the soil, to prohibit its exercises altogether. It is surely obvious that the word 'right' is, throughout the treaty, used as applicable to what the United States were to enjoy, in virtue of a recognized independence; and the word 'liberty' to what they were to enjoy, as concessions strictly dependent on the treaty itself."

Convention of 1818

Between 1815 and 1818 many American fishing vessels found fishing in British waters were seized and much ill-feeling was engendered. On Oct. 20, 1818, a Convention was signed at London, the first article of which read as follows:

ARTICLE I

"Whereas differences have arisen respecting the liberty claimed by the United States for the inhabitants thereof, to take, dry and cure fish on certain coasts, bays, harbours and creeks of His Britannic Majesty's dominions in America, it is agreed between the high contracting parties that the said inhabitants of the United States shall have forever, in common with the subjects of His Britannic Majesty, the liberty to take fish of every kind on that part of the southern coast of Newfoundland which extends from Cape Ray to the Rameau Islands, on the western and northern coast of Newfoundland from the said Cape Ray to the Quirpon Islands, on the shores of the Magdalen Islands, and also on the coasts, bays, harbours and creeks from Mount Joly on the southern coast of

Labrador, to and through the Streights of Belleisle and thence northwardly indefinitely along the coast, without prejudice, however, to any of the exclusive rights of the Hudson's Bay Company; And that the American fishermen shall also have liberty forever to dry and cure fish in any of the unsettled bays, harbours and creeks of the southern part of the coast of Newfoundland hereabove described, and of the coast of Labrador; but so soon as the same, or any portion thereof, shall be settled, it shall not be lawful for the said fishermen to dry or cure fish at such portion so settled, without previous agreement for such purpose with the inhabitants, proprietors or possessors of the ground. And the United States hereby renounce forever any liberty heretofore enjoyed or claimed by the inhabitants thereof, to take, dry, or cure fish on or within three marine miles of any of the coasts, bays, creeks or harbours of His Britannic Majesty's dominions in America not included within the above mentioned limits; Provided, however, that the American fisherman shall be admitted to enter such bays or harbours for the purpose of shelter and of repairing damages therein, of purchasing wood, and of obtaining water, and for no other purpose whatever. But they shall be under such restrictions as may be necessary to prevent their taking, drying or curing fish therein, or in any other manner whatever abusing the privileges hereby reserved to them."

By this article, the *right* to fish

(1). On the "banks" of Newfoundland,

(2). In the gulf of St. Lawrence, and

(3). At all other places in the sea,

remains as under the treaty of 1783.

The *liberties* are:

I. To take fish on the following British coasts—

(a). The southwestern coast of Newfoundland between cape Ray and the Rameau islands.

(b). The western coast of Newfoundland between cape Ray and the Quirpon islands.

(c). The shores of the Magdalen islands, and

(d). The coast of Labrador from mount Joly eastward and northward indefinitely, "without prejudice, however, to any of the exclusive rights of the Hudson Bay Company."

II. To dry and cure fish on—

(a). The *unsettled* bays, harbours and creeks of the south-western coast of Newfoundland between cape Ray and the Rameau islands, and

(b). The coast of Labrador.

In 1819, an Imperial Act was passed which recited the gravamen of Art. I and provided penalties for fishing in the 'excluded' waters.

From time to time seizures were made, but little trouble occurred until the passage by the legislature of Nova Scotia of the 'Hovering Act.' This Act, passed in 1836, provided penalties for hovering within three miles of the coasts or harbours.

Between 1818 and 1854 forty-three vessels were seized. Until 1841, the British construction of the treaty respecting the headland question and the right to purchase bait and supplies, or to tranship cargoes, was practically unprotested by the United States. In 1841, the United States Minister at London complained of the application of the headland rule and of the severity of the Nova Scotia statutes relating to the protection of the fisheries. The Government of Nova Scotia regarded with great anxiety the possibility of any relaxation of the regulations or the abandonment of any of their contentions. They requested that a series of questions respecting the points at issue be submitted to the legal advisers of the Home Government.

The Law Officers of the Crown replied that:

(1). Citizens of the United States had no rights other than those ceded to them by the Convention of 1818.

(2). Except within certain defined limits, they were excluded from fishing within three miles of the coast of British America and that the three miles was to be measured from a line drawn from headland to headland —the "extreme points of land next the sea of the coast or of the entrance of the bays . . . we are of the opinion that the term headland is used in the treaty[a] to express the part of the land we have before mentioned, excluding the interior of the bays and the inlets of the coast."

(3). No foreign country had the right to use or navigate the gut of Canso.

(4). American citizens had "no right to land or conduct the fishery from the shores of the Magdalen islands."

(5). "The liberty of entering the bays and harbours of Nova Scotia, for the purpose of purchasing wood and obtaining water, is conceded in general terms, unrestricted by any restrictions, expressed or implied."

Of the foregoing the most prominent point of difference was what is known as the "headland" controversy, referred to in answer 2 of the Hague Tribunal decision.

In Art. I of the Convention of 1818, the United States renounced the liberty "to take, dry or cure fish on or within three marine miles of any of the coasts, bays, creeks or harbours" not included within certain specified limits. The colonists claimed that United States fishermen were excluded from all bays, such as the bay of Fundy, Chaleur bay,

[a] This is an error on the part of the Law Officers. The word 'headland' does not appear in the treaty.

etc., irrespective of the width at the mouth. The United States, on the other hand, contended that the 'line of exclusion' followed the sinuosities of the coast, except that in bays it was to be drawn from headland to headland when the distance apart did not exceed six miles. For many years the English interpretation had been accepted by the Americans. Thus, in 1852, Mr. Webster admitted that "by a strict and rigid construction of this Article [Art. I, Treaty of 1818], fishing vessels of the United States are precluded from entering into bays and harbours of the British Provinces, except for the purposes of obtaining shelter, repairing damages and obtaining wood and water. A bay, as is usually understood, is an arm or recess of the sea entering from the ocean between capes and headlands; and the term is applied equally to small and large tracts of water thus situated. It is common to speak of Hudson's Bay or the Bay of Biscay, although they are very large tracts of water."

The headland doctrine was formally challenged by the United States in 1843, and followed by much diplomatic correspondence. In 1845, Lord Aberdeen informed Mr. Everett that the headland rule would be relaxed so far as the main body of the bay of Fundy was concerned. This concession, once made, it was never possible to regain and, but for the strong remonstrances of the Governments of Nova Scotia and New Brunswick, the Home Government would have made the same concessions with reference to all other "bays of which the mouths were more than six miles wide."

In the case of the *Washington*, which was referred to the Claims Commission appointed under the Convention of Feb. 8, 1853, the umpire gave the casting vote in favour of the United States contention "that the bay of Fundy is not a British bay nor a 'bay' within the meaning of the word used in the Treaties of 1783 and 1818." The umpire, Mr. Bates, was a junior member in an American branch of an English banking house and was chosen by lot. "It would have been absurd that either country should have been willing to accept the decision of Mr. Bates on a question of international law, as to the rights of either, or as to any interpretation of a treaty."

Reciprocity Treaty of 1854

From 1839 to 1854, numerous seizures were made. To adjust the points of difference between the two nations, the British Government, in 1854, sent Lord Elgin to the United States and, in the same year, he concluded a treaty in relation to the fisheries and to commerce and navigation. The first article of this treaty, commonly known as the Reciprocity Treaty of 1854, conceded to United States fishermen "the liberty to take fish of every kind, except shell-fish, on the seacoasts and shores, and in the bays, harbours, and creeks of Canada, New Brunswick, Nova Scotia, Prince Edward's Island, and of the

several islands thereunto adjacent, without being restricted to any distance from the shore, with permission to land upon the coasts and shores of those colonies and the islands thereof, and also upon the Magdalen Islands, for the purpose of drying their nets and curing their fish."

The second article conceded to British fishermen similar privileges on the eastern coast of the United States, north of the 36th parallel. The third article provided for reciprocal free trade between the United States and Canada and Newfoundland in various products.

The Reciprocity treaty was terminated by the United States in 1866. From 1866 to 1869, licenses were granted to United States fishing vessels, at first at the rate of 50 cents and, finally, at the rate of $2 per ton for each season for the same liberties as were granted under the Reciprocity treaty. In 1868 the Dominion Government passed a "Hovering Act" which practically re-enacted the Nova Scotia statute of 1836. It was amended in 1870 and in 1871, the regulations and penalties being made more stringent.

In 1870 the granting of fishing licenses was discontinued. In a communication to the United States it was stated that the British Government were of the opinion that, by the treaty of 1818, the United States had "renounced the right of fishing, not only within three miles of the colonial shores, but within three miles of a line drawn across the mouth of any British bay or creek.....It is, therefore, at present the wish of Her Majesty's government neither to concede nor for the present to enforce any rights which are in their nature open to any serious question. Even before the conclusion of the reciprocity treaty Her Majesty's government had consented to forego the exercise of its strict right to exclude American fishermen from the Bay of Fundy, and they are of opinion that during the present season that right should not be exercised in the body of the Bay of Fundy, and that American fishermen should not be interfered with, either by notice or otherwise, unless they are found within three miles of the shore, or within three miles of a line drawn across the mouth of a bay or creek which is less than ten geographical miles in width, in conformity with the arrangement made with France in1839.....Her Majesty's government do not desire that the prohibition to enter British bays should be generally insisted on except when there is reason to apprehend some substantial invasion of British rights."

Treaty of Washington, 1871 In 1871, a Joint High Commission met at Washington and, on May 8, signed the treaty of Washington respecting the fisheries, Alabama claims, etc. The treaty provided that, in addition to the "liberties" secured under the convention of 1818, the fishermen of the United States should have the liberty "to take fish of every kind except shell-fish on the coasts of the Maritime Provinces and to land to dry and cure the same". Art. XVIII provided that these liberties were to be in

operation for ten years after the necessary laws were passed and, further, until the expiration of two years after notice of termination by either party.

Art. XXI provided for the reciprocal free admission of fish and fish oil and Art. XXII for a commission to determine the indemnity to be paid to Canada for the fishing privileges in her territorial waters. This commission—commonly known as the Halifax Commission—awarded Canada $5,500,000. Of this amount, Canada received $4,490,882 and Newfoundland $1,009,118.

Following the denunciation of the treaty the Canadian Government seized United States vessels and, in 1886, passed an Act removing any question of liability of forfeiture of vessels for infractions of the statutes respecting purchase of bait, etc. Numerous protests were made by the United States and, after the discussion of these differences, a Commission was appointed by the two Governments to "treat and discuss the mode of settling all questions which have arisen out of the fisheries on the coasts of British North America."

Chamberlain-Bayard Treaty, 1888

As a result of their deliberations the, so-called, Chamberlain-Bayard treaty was signed Feb. 15, 1888. It provided for a commission to delimit the 'bays' etc., from which United States fishermen were excluded by Art. I, of the Treaty of 1818. With the exception of Chaleur, Miramichi and other specified bays, the line of exclusion was drawn across the bays in the part nearest the entrance where the width does not exceed ten miles.

The Treaty was rejected by the United States Senate.

In 1890, the Parliament of Canada passed an act authorizing the issue of annual licenses at a fee of one dollar and a half per ton to fishing vessels for the purchase of supplies.

Newfoundland Fisheries

Having briefly reviewed the differences respecting the fisheries of Canada, it is necessary to notice the conflict between the claims of the United States and Great Britain respecting the rights and privileges of the former in Newfoundland territorial waters, as embodied in the Convention of 1818.

Bait Act, 1887

Following the denunciation by the United States of the Treaty of Washington, and the consequent re-imposition of the duties on fish-products, the Newfoundland Government, in 1887, passed a Bait Act (50 Vict. Cap. 1) forbidding the sale or export of "any Herring, Caplin, Squid or other bait fishes." Prior to the passage of this Act, United States vessels resorting to the 'banks' purchased their bait in

Newfoundland but, under this regulation, they were confined to the 'Treaty Shore' and forced to catch it themselves. This involved three handicaps—'they do not carry the proper gear nor enough men for such work, bait is not obtainable there till late in the season and this area is too remote from the cod-fishing grounds. The Act could also seriously cripple their winter herring fishery at bay of Islands.'

In 1888, as already mentioned, Mr. Joseph Chamberlain and Mr. Bayard negotiated the, so-called, Chamberlain-Bayard Treaty which was rejected by the United States Senate. Pending the completion of the negotiations a *modus vivendi* was arranged, Newfoundland granting inshore fishing privileges to United States fishing vessels on payment of an annual license fee of $1.50 per ship ton. This was extended during the negotiations that resulted in the Bond-Blaine Convention.

Bond-Blaine Convention

In 1891, a draft Convention between Great Britain and the United States for the "Improvement of Commercial Relations between the United States and Newfoundland" was negotiated. It provided for: purchase of bait by United States vessels; the admission to the United States, free of duty, of Newfoundland fish—except 'green' cod; the reduction by Newfoundland of the duty on flour, pork and other articles of food and on coal oil and the admission free of duty of agricultural implements, raw cotton, etc., imported from the United States.

This Convention, commonly known as the Bond–Blaine Treaty was protested by Canada on the ground that, as the Newfoundland fisheries were the common property of all British subjects, that colony could not dispose of them in return for concessions to herself only. The Government of Great Britain, accordingly, declined to ratify it pending the negotiation by Canada of a reciprocity treaty with the United States.

The Newfoundland Statutes of 1892, provided for:

(a) Compulsory pilotage for the port of St. John.

(b) Close season for herring, salmon and bait fishes.

(c) Size of mesh of net.

(d) Forbade the unlicensed exportation or sale of bait fishes.

In 1893, an Act was passed forbidding unlicensed foreign fishing vessels to purchase bait-fish or to engage Newfoundlanders. The "Customs Act," 1898, provided for the entering and clearing of all foreign vessels arriving at, or departing from, the coasts of the colony. An Act of 1899, levied light dues on all vessels "other than coasting, sealing or fishing vessels owned and registered" in Newfoundland.

Bond-Hay Convention

November 8, 1902, another treaty was negotiated. The terms of the new Convention were similar to those of the 1891 treaty except that the free list of United States imports into

Newfoundland was increased to include a number of articles, principally manufactured articles, not included in the earlier convention.

This treaty was also abortive as the United States Senate inserted amendments that made it unacceptable to Newfoundland.

Following the failure to secure free entry of their fish-products into the United States, the Government of Newfoundland discontinued the *modus vivendi* and enacted additional legislation. "The Foreign Fishing Vessels Act, 1905" (5 Edward VII, Cap. 4) provided for the forfeiture of any foreign vessels having on board any bait-fish, ice or other supplies for the fishery, purchased in Newfoundland waters or if the master had "engaged or attempted to engage any person to form part of the crew of the said vessel in any port or any part of the coasts" of Newfoundland. The presence on board any foreign vessel in Newfoundland waters, of bait-fish or other fishery supplies was declared to be *prima facie* evidence of their purchase within such ports or waters.

In October of the same year, the United States Government made strong protests against the enforcement of these laws by the Newfoundland authorities. They contended that United States fishing vessels were not bound to enter at a Newfoundland custom house unless they purposed to trade as well as fish. Exception was also taken to the above mentioned clauses of "The Foreign Fishing Vessels Act, 1905."

The Government of Great Britain, in reply, pointed out that by the Convention of 1818:

(a) The privileges of fishing were conceded to *inhabitants* of the United States, not to United States' *vessels*.

(b) The inhabitants of the United States only enjoyed it "in common with" British subjects. Therefore, it was not a free but a regulated fishery and that United States fishermen were bound to comply with all Colonial Laws and Regulations including and touching the fishery so long as these were not in their nature unreasonable and were applicable to all fisheries alike.

(c) That the law respecting fishing vessels entering and clearing at Newfoundland custom houses did not impose obligations inconsistent with the Convention of 1818. They held that "the only ground on which the application of any provisions of the Colonial Law to American vessels can be objected to is that it unreasonably interferes with the exercise of the American right of fishery."

It was "admitted that the majority of the American vessels lately engaged in the fishery on the western coast of the Colony were registered vessels, as opposed to licensed fishing vessels, and as such were at liberty both to trade and to fish. The production of evidence of the United States' registration is therefore not sufficient to establish that a vessel

.....does not purpose to trade as well as fish, and something more would seem clearly to be necessary." Without supervision of this nature it would be impossible to prevent illicit trade.

(d) That Section 7 of "The Foreign Fishing Vessels Act, 1905" preserved "the rights and privileges granted by Treaty to the subjects of any State in amity with His Majesty."

In 1906, a *modus vivendi* was arranged. The British Government suspended the Newfoundland "Foreign Fishing Vessels Act, 1906," which imposed on United States vessels certain restrictions in addition to those imposed by the Act of 1905; the provisions of the first part of Section 1 of the Act of 1905 as to boarding and bringing into port and the whole of Sec. 3 of the same Act were not regarded as applying to United States fishing vessels and the use of purse seines was permitted for that season. The United States Government agreed that its fishermen would comply with the Colonial Fishery Regulations respecting the payment of light dues and fishing on Sunday; that the shipment of Newfoundlanders would be made far enough from the three-mile limit to avoid any reasonable doubt and that they would enter and clear at Newfoundland custom houses when physically possible to do so.

This *modus vivendi* continued in force till arbitration before the Hague Tribunal was arranged for, and since.

Agreement to Arbitrate On Jan. 27, 1909, Mr. James Bryce and Mr. Elihu Root signed a "Special Agreement for the submission of questions relating to Fisheries on the North Atlantic Coast under the general Convention of Arbitration concluded between Great Britain and the United States on April 4, 1908."

It recited that "whereas, differences have arisen as to the scope and meaning of the said article, [Art.I, Convention of London, 1818,] and of the liberties therein referred to, and otherwise in respect the rights and liberties which the inhabitants of the United States have or claim to have in the waters or on the shores therein referred to:

It is agreed that the following questions shall be submitted for decision to a tribunal of arbitration constituted as hereinafter provided:

Question 1. To what extent are the following contentions or either of them justified?

It is contended on the part of Great Britain that the exercise of the liberty to take fish referred to in the said article, which the inhabitants of the United States have for ever in common with the subjects of His Britannic Majesty, is subject, without the consent of the United States, to reasonable regulation by Great Britain, Canada, or Newfoundland in the form of municipal laws, ordinances, or rules, as, for example, to regulations in

respect of (1) the hours, days, or seasons when fish may be taken on the treaty coasts; (2) the method, means, and implements to be used in the taking of fish or in the carrying on of fishing operations on such coasts; (3) any other matters of a similar character relating to fishing; such regulations being reasonable, as being, for instance—

(a) Appropriate or necessary for the protection and preservation of such fisheries and the exercise of the rights of British subjects therein and of the liberty which by the said Article I the inhabitants of the United States have therein in common with British subjects;

(b) Desirable on grounds of public order and morals;

(c) Equitable and fair as between local fishermen and the inhabitants of the United States exercising the said treaty liberty and not so framed as to give unfairly an advantage to the former over the latter class.

It is contended on the part of the United States that the exercise of such liberty is not subject to limitations or restraints by Great Britain, Canada, or Newfoundland in the form of municipal laws, ordinances, or regulations in respect of (1) the hours, days, or seasons when the inhabitants of the United States may take fish on the treaty coasts, or (2) the method, means, and implements used by them in taking fish or in carrying on fishing operations on such coasts, or (3) any other limitations or restraints of similar character—

(a) Unless they are appropriate and necessary for the protection and preservation of the common rights in such fisheries and the exercise thereof; and

(b) Unless they are reasonable in themselves and fair as between local fishermen and fishermen coming from the United States, and not so framed as to give an advantage to the former over the latter class; and

(c) Unless their appropriateness, necessity, reasonableness, and fairness be determined by the United States and Great Britain by common accord and the United States concurs in their enforcement.

Question 2. Have the inhabitants of the United States, while exercising the liberties referred to in said article, a right to employ as members of the fishing crews of their vessels persons not inhabitants of the United States?

Question 3. Can the exercise by the inhabitants of the United States of the liberties referred to in the said article be subjected, without the consent of the United States, to the requirements of entry or report at custom-houses or the payment of light or harbour or other dues, or to any other similar requirement or condition or exaction?

Question 4. Under the provision of the said article that the American fishermen shall be admitted to enter certain bays or harbours for shelter,

repairs, wood, or water, and for no other purpose whatever, but that they shall be under such restrictions as may be necessary to prevent their taking, drying, or curing fish therein or in any other manner whatever abusing the privileges thereby reserved to them, is it permissible to impose restrictions making the exercise of such privileges conditional upon the payment of light or harbour or other dues, or entering or reporting at custom-houses or any similar conditions?

Question 5. From where must be measured the '3 marine miles of any of the coasts, bays, creeks, or harbours' referred to in the said article?

Question 6. Have the inhabitants of the United States the liberty under the said article or otherwise to take fish in the bays, harbours, and creeks on that part of the southern coast of Newfoundland which extends from Cape Ray to Rameau Islands, or on the western and northern coasts of Newfoundland from Cape Ray to Quirpon Islands, or on the Magdalen Islands?

Question 7. Are the inhabitants of the United States whose vessels resort to the treaty coasts for the purpose of exercising the liberties referred to in Article I of the treaty of 1818 entitled to have for those vessels, when duly authorized by the United States in that behalf, the commercial privileges on the treaty coasts accorded by agreement or otherwise to United States trading vessels generally?

ARTICLE 2

Either party may call the attention of the tribunal to any legislative or executive act of the other party, specified within three months of the exchange of notes enforcing this agreement, and which is claimed to be inconsistent with the true interpretation of the treaty of 1818; and may call upon the tribunal to express in its award its opinion upon such acts, and to point out in what respects, if any, they are inconsistent with the principles laid down in the award in reply to the preceding questions; and each party agrees to conform to such opinion.

ARTICLE 3

If any question arises in the arbitration regarding the reasonableness of any regulation or otherwise which requires an examination of the practical effect of any provisions in relation to the conditions surrounding the exercise of the liberty of fishery enjoyed by the inhabitants of the United States, or which requires expert information about the fisheries themselves, the tribunal may, in that case, refer such question to a commission of three expert specialists in such matters, one to be designated by each of the parties hereto and the third, who shall not be a national

of either party, to be designated by the tribunal. This commission shall examine into and report their conclusions on any question or questions so referred to it by the tribunal, and such report shall be considered by the tribunal and shall, if incorporated by them in the award, be accepted as a part thereof.

Pending the report of the commission upon the question or questions so referred, and without awaiting such report, the tribunal may make a separate award upon all or any other questions before it, and such separate award, if made, shall become immediately effective, provided that the report aforesaid shall not be incorporated in the award until it has been considered by the tribunal. The expenses of such commission shall be borne in equal moieties by the parties hereto.

ARTICLE 4

The tribunal shall recommend for the consideration of the high contracting parties rules and a method of procedure under which all questions which may arise in the future regarding the exercise of the liberties above referred to may be determined in accordance with the principles laid down in the award. If the high contracting parties shall not adopt the rules and method of procedure so recommended, or, if they shall not, subsequently to the delivery of the award, agree upon such rules and methods, then any differences which may arise in the future between the high contracting parties relating to the interpretation of the treaty of 1818 or to the effect and application of the award of the tribunal, shall be referred informally to the Permanent Court at The Hague for decision by the summary procedure provided in Chapter IV of the Hague Convention of the 18th October, 1907.

ARTICLE 5

The Tribunal of Arbitration provided for herein shall be chosen from the general list of members of the Permanent Court at The Hague, in accordance with the provisions of article 45 of the Convention for the Settlement of International Disputes, concluded at the Second Peace Conference at The Hague on the 18th October, 1907. The provisions of said convention, so far as applicable and not inconsistent herewith, and excepting articles 53 and 54, shall govern the proceedings under the submission herein provided for.

The time allowed for the direct agreement of His Britannic Majesty and the President of the United States on the composition of such tribunal shall be three months.

ARTICLE 6

The pleadings shall be communicated in the order and within the time following:

As soon as may be, and within a period not exceeding seven months from the date of the exchange of notes making this agreement binding, the printed Case of each of the parties hereto, accompanied by printed copies of the documents, the official correspondence, and all other evidence on which each party relies, shall be delivered in duplicate (with such additional copies as may be agreed upon) to the agent of the other party. It shall be sufficient for this purpose if such Case is delivered at the British Embassy at Washington or at the American Embassy at London, as the case may be, for transmission to the agent for its Government.

Within fifteen days thereafter such printed Case and accompanying evidence of each of the parties shall be delivered in duplicate to each member of the tribunal, and such delivery may be made by depositing within the stated period the necessary number of copies with the International Bureau at The Hague for transmission to the arbitrators.

After the delivery on both sides of such printed Case, either party may, in like manner, and within four months after the expiration of the period above fixed for the delivery to the agents of the Case, deliver to the agent of the other party (with such additional copies as may be agreed upon), a printed Counter-Case accompanied by printed copies of additional documents, correspondence, and other evidence in reply to the case, documents, correspondence, and other evidence so presented by the other party, and within fifteen days thereafter such party shall, in like manner as above provided, deliver in duplicate such Counter-Case and accompanying evidence to each of the arbitrators.

The foregoing provisions shall not prevent the tribunal from permitting either party to rely at the hearing upon documentary or other evidence which is shown to have become open to its investigation or examination or available for use too late to be submitted within the period hereinabove fixed for the delivery of copies of evidence, but in case any such evidence is to be presented, printed copies of it, as soon as possible after it is secured, must be delivered, in like manner as provided for the delivery of copies of other evidence, to each of the arbitrators and to the agent of the other party. The admission of any such additional evidence, however, shall be subject to such conditions as the tribunal may impose, and the other party shall have a reasonable opportunity to offer additional evidence in rebuttal.

The tribunal shall take into consideration all evidence which is offered by either party.

ARTICLE 7

If in the Case or Counter-Case (exclusive of the accompanying evidence) either party shall have specified or referred to any documents, correspondence, or other evidence in its own exclusive possession without annexing a copy, such party shall be bound, if the other party shall demand it within thirty days after the delivery of the Case or Counter-Case respectively, to furnish to the party applying for it a copy thereof; and either party may, within the like time, demand that the other shall furnish certified copies or produce for inspection the originals of any documentary evidence adduced by the party upon whom the demand is made. It shall be the duty of the party upon whom any such demand is made to comply with it as soon as may be, and within a period not exceeding fifteen days after the demand has been received. The production for inspection or the furnishing to the other party of official governmental publications, publishing, as authentic, copies of the documentary evidence referred to, shall be a sufficient compliance with such demand, if such governmental publications shall have been published prior to the 1st day of January, 1908. If the demand is not complied with, the reasons for the failure to comply must be stated to the tribunal.

ARTICLE 8

The tribunal shall meet within six months after the expiration of the period above fixed for the delivery to the agents of the Case, and upon the assembling of the tribunal at its first session each party, through its agent or counsel, shall deliver in duplicate to each of the arbitrators and to the agent and counsel of the other party (with such additional copies as may be agreed upon) a printed Argument showing the points and referring to the evidence upon which it relies.

The time fixed by this agreement for the delivery of the Case, Counter-Case, or Argument, and for the meeting of the tribunal, may be extended by mutual consent of the parties.

ARTICLE 9

The decision of the tribunal shall, if possible, be made within two months from the close of the arguments on both sides, unless on the request of the tribunal the parties shall agree to extend the period.

It shall be made in writing, and dated and signed by each member of the tribunal, and shall be accompanied by a statement of reasons.

A member who may dissent from the decision may record his dissent when signing.

The language to be used throughout the proceedings shall be English.

ARTICLE 10

Each party reserves to itself the right to demand a revision of the award. Such demand shall contain a statement of the grounds on which it is made and shall be made within five days of the promulgation of the award, and shall be heard by the tribunal within ten days thereafter. The party making the demand shall serve a copy of the same on the opposite party, and both parties shall be heard in argument by the tribunal on said demand. The demand can only be made on the discovery of some new fact or circumstance calculated to exercise a decisive influence upon the award, and which was unknown to the tribunal and to the party demanding the revision at the time the discussion was closed, or upon the ground that the said award does not fully and sufficiently, within the meaning of this agreement, determine any question or questions submitted. If the tribunal shall allow the demand for a revision, it shall afford such opportunity for further hearings and arguments as it shall deem necessary.

ARTICLE 11

The present agreement shall be deemed to be binding only when confirmed by the two governments by an exchange of notes.

In witness whereof this Agreement has been signed and sealed by His Britannic Majesty's Ambassador at Washington, the Right Honourable JAMES BRYCE, O.M., on behalf of Great Britain, and by the Secretary of State of the United States, ELIHU ROOT, on behalf of the United States.

Done at Washington on the 27th day of January, one thousand nine hundred and nine.

JAMES BRYCE. (Seal.)

ELIHU ROOT. (Seal.)

Under the provisions of Art. 2 of the Special Agreement, the United States claimed that the following legislative and executive Acts of Canada and Newfoundland were inconsistent with the true interpretation of the Treaty of 1818:—

The British Government called upon the Tribunal to express in its award, its opinion upon "certain acts of the United States Government directed towards or amounting to an attempt at the policing by the national vessels of the United States of the so called Treaty coast, that is to say those parts of the coast of Newfoundland, Labrador, and the Magdalen Islands, on which the inhabitants of the United States have under the said Treaty, a liberty to take fish in common with the subjects of His Britannic Majesty."

Personnel of the Tribunal

The Tribunal of Arbitration was convened at The Hague, June 1, 1910, and was constituted as follows:

Mr. H. LAMMASCH, Doctor of Law, Professor of the University of Vienna, Aulic Councillor, Member of the Upper House of the Austrian Parliament; His Excellency Jonkheer A. F. DE SAVORNIN LOHMAN, Doctor of Law, Minister of State, former Minister of the Interior, Member of the Second Chamber of the Netherlands; the Honourable GEORGE GRAY, Doctor of Laws, Judge of the United States Circuit of Appeals, former United States Senator; the Right Honourable Sir CHARLES FITZPATRICK, Member of the Privy Council, Doctor of Laws, Chief Justice of Canada; the Honourable LUIS MARIA DRAGO, Doctor of Law, former Minister of Foreign Affairs of the Argentine Republic, Member of the Law Academy of Buenos Aires;

For Great Britain:

Mr. (now Sir) Allen B. Aylesworth, K.C., agent; Sir William Snowden Robson, K.C., M.P., Sir Robert Finlay, K.C., M.P., Sir Edward P. Morris, K.C., Mr. Donald Morrison, K.C., Sir James S. Winter, K.C., Mr. John S. Ewart, K.C., Mr. George F. Shepley, K.C., Sir H. Erle Richards, K.C., Mr. A. F. Peterson, K.C., Mr. W. N. Tilley, Mr. Raymond Asquith, Mr. Geoffrey Lawrence, Mr. Hamar Greenwood; Messrs. Blake and Redden, solicitors; Mr. H. E. Dale, of the Colonial Office; Mr. John D. Clarke, Secretary of the Agency.

For the United States:

Mr. Chandler P. Anderson, agent; Senator Elihu Root, Senator George Turner, Mr. Samuel J. Elder, Mr. Charles B. Warren, Dr. James Brown Scott, Mr. Robert Lansing, and Mr. Otis Thomas Cartwright, Secretary of the Agency.

Secretaries of the Tribunal:

Baron Michiels van Verduynen, Secretary-General; Jonkheer Roell, Mr. Charles D. White, and Mr. George Young.

At the first sitting of the tribunal, Prof. Lammasch delivered the inaugural speech. He said: "Perhaps no question of such gravity and involving such complications had ever been submitted to arbitration. . . . . By submitting this century-old conflict to the Court, America and Great Britain have expressed their complete confidence in this pacific method of settling international conflicts, have given an example to the whole community of nations, and have won for themselves fresh credit in the cause of international justice and peace, for which those Powers have, perhaps, done more than the other nations, especially during the reign of the great monarch whose premature and sudden death has so

recently been lamented by his vast empire, and under the presidency of the illustrious statesman who inaugurated procedure by the Arbitration Tribunal in the 'Pious Fund' case."

The Award

On September 7, 1910, the award of the Arbitrators was rendered. The text is as follows:

QUESTION I

To what extent are the following contentions or either of them justified?

It is contended on the part of Great Britain that the exercise of the liberty to take fish referred to in the said Article, which the inhabitants of the United States have forever in common with the subjects of His Britannic Majesty, is subject, without the consent of the United States, to reasonable regulation by Great Britain, Canada, or Newfoundland in the form of municipal laws, ordinances, or rules, as, for example, to regulations in respect of (1) the hours, days, or seasons when fish may be taken on the treaty coasts; (2) the method, means, and implements to be used in the taking of fish or in carrying on of fishing operations on such coasts; (3) any other matters of a similar character relating to fishing; such regulations being reasonable, as being, for instance—

(*a*) Appropriate or necessary for the protection and preservation of such fisheries and the exercise of the rights of British subjects therein and of the liberty which by the said Article I the inhabitants of the United States have therein in common with British subjects.

(*b*) Desirable on grounds of public order and morals;

(*c*) Equitable and fair as between local fishermen and the inhabitants of the United States exercising the said treaty liberty, and not so framed as to give unfairly an advantage to the former over the latter class.

It is contended on the part of the United States that the exercise of such liberty is not subject to limitations or restraints by Great Britain, Canada, or Newfoundland in the form of municipal laws, ordinances, or regulations in respect of (1) the hours, days, or seasons when the inhabitants of the United States may take fish on the treaty coasts, or (2) the method, means and implements used by them in taking fish or in carrying on fishing operations on such coasts, or (3) any other limitations or restraints of similar character—

(*a*) Unless they are appropriate and necessary for the protection and preservation of the common rights in such fisheries and the exercise thereof; and

(*b*) Unless they are reasonable in themselves and fair as between local fishermen and fishermen coming from the United States, and not so framed as to give an advantage to the former over the latter class; and

(*c*) Unless their appropriateness, necessity, reasonableness, and fairness be determined by the United States and Great Britain by common accord and the United States concurs in their enforcement.

Question I, thus submitted to the Tribunal, resolves itself into two main contentions:

1st. Whether the right of regulating reasonably the liberties conferred by the Treaty of 1818 resides in Great Britain;

2nd. And, if such right does so exist, whether such reasonable exercise of the right is permitted to Great Britain without the accord and concurrence of the United States.

The Treaty of 1818 contains no explicit disposition in regard to the right of regulation, reasonable or otherwise; it neither reserves that right in express terms, nor refers to it in any way. It is therefore incumbent on this Tribunal to answer the two questions above indicated by interpreting the general terms of Article I of the Treaty, and more especially the words 'the inhabitants of the United States shall have, for ever, in common with the subjects of His Britannic Majesty, the liberty to take fish of every kind.' This interpretation must be conformable to the general import of the instrument, the general intention of the parties to it, the subject matter of the contract, the expressions actually used and the evidence submitted.

Now in regard to the preliminary question as to whether the right of reasonable regulation resides in Great Britain:

Considering that the right to regulate the liberties conferred by the Treaty of 1818 is an attribute of sovereignty, and as such must be held to reside in the territorial sovereign, unless the contrary be provided; and considering that one of the essential elements of sovereignty is that it is to be exercised within territorial limits, and that, failing proof to the contrary, the territory is coterminous with the sovereignty, it follows that the burden of the assertion involved in the contention of the United States (viz., that the right to regulate does not reside independently in Great Britain, the territorial sovereign) must fall on the United States. And for the purpose of sustaining this burden, the United States have put forward the following series of propositions, each one of which must be singly considered.

It is contended by the United States:

(1) That the French right of fishery under the Treaty of 1713, designated also as a liberty, was never subjected to regulation

by Great Britain, and therefore the inference is warranted that the American liberties of fishery are similarly exempted.

The Tribunal is unable to agree with this contention:

(a) Because although the French right designated in 1713 merely 'an allowance,' (a term of even less force than that used in regard to the American fishery) was nevertheless converted, in practice, into an exclusive right; this concession on the part of Great Britain was presumably made because France, before 1713, claimed to be the sovereign of Newfoundland, and, in ceding the Island, had, as the American argument says, 'reserved for the benefit of its subjects the right to fish and to use the strand';

(b) Because the distinction between the French and American right is indicated by the different wording of the Statutes for the observance of Treaty obligations towards France and the United States, and by the British Declaration of 1783;

(c) And, also, because this distinction is maintained in the Treaty with France of 1904, concluded at a date when the American claim was approaching its present stage, and by which certain common rights of regulation are recognized to France.

For the further purpose of such proof it is contended by the United States:

(2) That the liberties of fishery, being accorded to the inhabitants of the United States "forever," acquire, by being in perpetuity and unilateral, a character exempting them from local legislation.

The Tribunal is unable to agree with this contention:

(a) Because there is no necessary connection between the duration of a grant and its essential status in its relation to local regulation; a right granted in perpetuity may yet be subject to regulation, or, granted temporarily, may yet be exempted therefrom; or being reciprocal may yet be unregulated, or being unilateral may yet be regulated: as is evidenced by the claim of the United States that the liberties of fishery accorded by the Reciprocity Treaty of 1854 and the Treaty of 1871 were exempt from regulation, though they were neither permanent nor unilateral;

(b) Because no peculiar character need be claimed for these liberties in order to secure their enjoyment in perpetuity, as is evidenced by the American negotiators in 1818 asking for the insertion of the word "forever." International law in its modern development recognizes that a great number of Treaty obligations are not annulled by war, but at most suspended by it;

(c) Because the liberty to dry and cure is, pursuant to the terms of the Treaty, provisional and not permanent, and is nevertheless, in respect of the liability to regulation, identical in its nature with, and never distinguished from, the liberty to fish.

For the further purpose of such proof, the United States allege:

(3) That the liberties of fishery granted to the United States constitute an International servitude in their favour over the territory of Great Britain, thereby involving a derogation from the sovereignty of Great Britain, the servient State, and that therefore Great Britain is deprived, by reason of the grant, of its independent right to regulate the fishery.

The Tribunal is unable to agree with this contention:

(a) Because there is no evidence that the doctrine of International servitudes was one with which either American or British statesmen were conversant in 1818, no English publicists employing the term before 1818, and the mention of it in Mr. GALLATIN's report being insufficient;

(b) Because a servitude in the French Law, referred to by Mr. GALLATIN, can, since the Code, be only real and cannot be personal (Code Civil, art. 686);

(*c*) Because a servitude in International law predicates an express grant of a sovereign right and involves an analogy to the relation of a *praedium dominans* and a *praedium serviens*; whereas by the Treaty of 1818 one State grants a liberty to fish, which is not a sovereign right, but a purely economic right, to the inhabitants of another State;

(*d*) Because the doctrine of international servitude in the sense which is now sought to be attributed to it originated in the peculiar and now obsolete conditions prevailing in the Holy Roman Empire of which the *domini terrae* were not fully sovereigns; they holding territory under the Roman Empire, subject at least theoretically, and in some respects also practically, to the Courts of that Empire; their right being, moreover, rather of a civil than of a public nature, partaking more of the character of *dominium* than of *imperium*, and therefore certainly not a complete sovereignty. And because in contradistinction to this quasi-sovereignty with its incoherent attributes acquired at various times, by various means, and not impaired in its character by being incomplete in any one respect or by being limited in favour of another territory and its possessor, the modern State, and particularly Great Britain, has never admitted partition of sovereignty, owing to the constitution of a modern State requiring essential sovereignty and independence;

(*e*) Because this doctrine being but little suited to the principle of sovereignty which prevails in States under a system of constitutional government such as Great Britain and the United States, and to the present International relations of Sovereign States, has found little, if any, support from modern publicists. It could, therefore, in the general interest of the Community of Nations, and of the Parties to this Treaty, be affirmed by this Tribunal only on the express evidence of an International contract;

(*f*) Because even if these liberties of fishery constituted an International servitude, the servitude would derogate from the sovereignty of the servient State only in so far as the exercise of the rights of sovereignty by the servient State would be contrary to the exercise of the servitude right by the dominant State. Whereas it is evident that, though every regulation of the fishery is to some extent a limitation, as it puts limits to the exercise of the fishery at will, yet such regulations as are reasonable and made for the purpose of securing and preserving the fishery and its exercise for the common benefit are clearly to be distinguished from those restrictions and "molestations," the annulment of which was the purpose of the American demands formulated by Mr. ADAMS in 1782, and such regulations consequently cannot be held to be inconsistent with a servitude;

(*g*) Because the fishery to which the inhabitants of the United States were admitted in 1783, and again in 1818, was a regulated fishery, as is evidenced by the following regulations:

Act 15 Charles II, Cap. 16, s. 7 (1663) forbidding "to lay any seine or other net in or near any harbour in Newfoundland, whereby to take the spawn or young fry of the Poor-John, or for any other use or uses, except for the taking of bait only," which had not been superseded either by the order in council of March 10, 1670, or by the Statute X and XI Wm. III, Cap. 25 (1699.) The order in council provides expressly for the obligation "to submit unto and to observe all rules and orders as are now, or hereafter shall be established," an obligation which cannot be read as referring only to the rules established. In a similar way, the Statute of 1699 preserves in force prior legislation, conferring the freedom of fishery only "as fully and freely as at any time heretofore." The order in council, 1670, provides that the Admirals, who always were fishermen, arriving from an English or Welsh port, "see that His Majesty's rules and orders concerning the regulation of the fisheries are duly put in execution" (sec. 13). Likewise the Act X and XI, Wm. III, Cap. 25 (1699) provides that the Admirals do settle differences between the fishermen arising in respect of the places to be assigned to the different vessels. As to Nova Scotia, the proclamation of 1665 ordains that no one shall fish without license; that the licensed fishermen are obliged "to observe all laws and orders which now are made and published, or shall hereafter be made and published in this jurisdiction," and that they shall not fish on the Lord's day and shall not take fish at the time they come to spawn. The judgment of the Chief Justice of Newfoundland, October 26, 1820, is not held by the Tribunal sufficient to set aside the proclamations referred to. After 1783, the statute 26 Geo. III, Cap. 26 (1786), forbids "the use, on the shores of Newfoundland, of seines or nets for catching cod by hauling on shore or taking into boat, with meshes less than 4 inches;" a prohibition which cannot be considered as limited to the bank fishery. The act for regulating the fisheries of New Brunswick, 1793, which forbids "the placing of nets or seines across any

cove or creek in the Province so as to obstruct the natural course of fish," and which makes specific provision for fishing in the Harbour of St. John, as to the manner and time of fishing, cannot be read as being limited to fishing from the shore. The act for regulating the fishing on the coast of Northumberland (1797) contains very elaborate dispositions concerning the fisheries in the Bay of Miramichi which were continued in 1823, 1829 and 1834. The Statutes of Lower Canada, 1788 and 1807, forbid the throwing overboard of offal. The fact that these acts extend the prohibition over a greater distance than the first marine league from the shore may make them non-operative against foreigners without the territorial limits of Great Britain, but is certainly no reason to deny their obligatory character for foreigners within the limits;

(*h*) Because the fact that Great Britain rarely exercised the right of regulation in the period immediately succeeding 1818 is to be explained by various circumstances and is not evidence of the non-existence of the right;

(*i*) Because the words "in common with British subjects" tend to confirm the opinion that the inhabitants of the United States were admitted to a regulated fishery;

(*j*) Because the Statute of Great Britain, 1819, which gives legislative sanction to the Treaty of 1818, provides for the making of "regulations with relation to the taking, drying and curing of fish by inhabitants of the United States in 'common.' "

For the purpose of such proof, it is further contended by the United States, in this latter connection:

(4) That the words "in common with British subjects" used in the Treaty should not be held as importing a common subjection to regulation, but as intending to negative a possible pretension on the part of the inhabitants of the United States to liberties of fishery exclusive of the right of British subjects to fish.

The Tribunal is unable to agree with this contention:

(a) Because such an interpretation is inconsistent with the historical basis of the American fishing liberty. The ground on which Mr. Adams founded the American right in 1782 was that the people then constituting the United States had always, when still under British rule, a part in these fisheries and that they must continue to enjoy their past right in the future. He proposed "that the subjects of His Britannic Majesty and the people of the United States shall continue to enjoy unmolested the right to take fish.....where the inhabitants of both countries used, at any time heretofore, to fish." The theory of the partition of the fisheries, which by the American negotiators had been advanced with so much force, negatives the assumption that the United States could ever pretend to an

exclusive right to fish on the British shores; and to insert a special disposition to that end would have been wholly superfluous;

(*b*) Because the words "in common" occur in the same connection in the Treaty of 1818 as in the Treaties of 1854 and 1871. It will certainly not be suggested that in these Treaties of 1854 and 1871 the American negotiators meant by inserting the words "in common" to imply that without these words American citizens would be precluded from the right to fish on their own coasts and that, on American shores, British subjects should have an exclusive privilege. It would have been the very opposite of the concept of territorial waters to suppose that, without a special treaty-provision, British subjects could be excluded from fishing in British waters. Therefore that cannot have been the scope and the sense of the words " in common";

(*c*) Because the words "in common" exclude the supposition that American inhabitants were at liberty to act at will for the purpose of taking fish, without any regard to the co-existing rights of other persons entitled to do the same thing; and because these words admit them only as members of a social community, subject to the ordinary duties binding upon the citizens of that community, as to the regulations made for the common benefit; thus avoiding the "*bellum omnium contra omnes*" which would otherwise arise in the exercise of this industry;

(*d*) Because these words are such as would naturally suggest themselves to the negotiators of 1818 if their intention had been to express a common subjection to regulations as well as a common right.

In the course of the Argument it has also been alleged by the United States:

(5) That the Treaty of 1818 should be held to have entailed a transfer or partition of sovereignty, in that it must in respect to the liberties of fishery be interpreted in its relation to the Treaty of 1783; and that this latter Treaty was an act of partition of sovereignty and of separation, and as such was not annulled by the war of 1812.

Although the Tribunal is not called upon to decide the issue whether the Treaty of 1783 was a treaty of partition or not, the questions involved therein having been set at rest by the subsequent Treaty of 1818, nevertheless the Tribunal could not forbear to consider the contention on account of the important bearing the controversy has upon the true interpretation of the Treaty of 1818. In that respect the Tribunal is of opinion:

(*a*) That the right to take fish was accorded as a condition of peace to a foreign people; wherefore the British negotiators refused to place the right of British subjects on the same footing with those of American

inhabitants; and further, refused to insert the words also proposed by Mr. ADAMS—"continue to enjoy"—in the second branch of Art. III of the Treaty of 1783;

(*b*) That the Treaty of 1818 was in different terms, and very different in extent, from that of 1783, and was made for different considerations. It was, in other words, a new grant.

For the purpose of such proof it is further contended by the United States:

(6) That as contemporary Commercial Treaties contain express provisions for submitting foreigners to local legislation, and the Treaty of 1818 contains no such provision, it should be held, *a contrario*, that inhabitants of the United States exercising these liberties are exempt from regulation.

The Tribunal is unable to agree with this contention:

(*a*) Because the Commercial Treaties contemplated did not admit foreigners to all and equal rights, seeing that local legislation excluded them from many rights of importance, e.g., that of holding land; and the purport of the provisions in question consequently was to preserve these discriminations. But no such discriminations existing in the common enjoyment of the fishery by American and British fishermen, no such provision was required;

(*b*) Because no proof is furnished of similar exemptions of foreigners from local legislation in default of Treaty stipulations subjecting them thereto;

(*c*) Because no such express provision for subjection of the nationals of either Party to local law was made either in this Treaty, in respect to their reciprocal admission to certain territories as agreed in Art. III, or in Art. III of the Treaty of 1794; although such subjection was clearly contemplated by the Parties.

For the purpose of such proof it is further contended by the United States:

(7) That as the liberty to dry and cure on the treaty coasts and to enter bays and harbours on the non-treaty coasts are both subjected to conditions, and the latter to specific restrictions, it should therefore be held that the liberty to fish should be subjected to no restrictions, as none are provided for in the Treaty.

The Tribunal is unable to apply the principle of "*expressio unius exclusio alterius*" to this case:

(*a*) Because the conditions and restrictions as to the liberty to dry and cure on the shore and to enter the harbours are limitations of the

rights themselves, and not restrictions of their exercise. Thus, the right to dry and cure is limited in duration, and the right to enter bays and harbours is limited to particular purposes.

(*b*) Because these restrictions of the right to enter bays and harbours applying solely to American fishermen must have been expressed in the Treaty, whereas regulations of the fishery, applying equally to American and British, are made by right of territorial sovereignty.

For the purpose of such proof it has been contended by the United States:

(8) That LORD BATHURST in 1815 mentioned the American right under the Treaty of 1783 as a right to be exercised "at the discretion of the United States"; and that this should be held as to be derogatory to the claim of exclusive regulation by Great Britain.

But the Tribunal is unable to agree with this contention:

(*a*) Because these words implied only the necessity of an express stipulation for any liberty to use foreign territory at the pleasure of the grantee, without touching any question as to regulation;

(*b*) Because in this same letter LORD BATHURST characterized this right as a policy "temporary and experimental, depending on the use that might be made of it, on the condition of the islands and places where it was to be exercised, and the more general conveniences or inconveniences from a military, naval and commercial point of view"; so that it cannot have been his intention to acknowledge the exclusion of British interference with this right;

(*c*) Because LORD BATHURST in his note to Governor Sir C. HAMILTON in 1819 orders the Governor to take care that the American fishery on the coast of Labrador be carried on *in the same manner* as previous to the late war; showing that he did not interpret the Treaty just signed as a grant conveying absolute immunity from interference with the American fishery right.

For the purpose of such proof it is further contended by the United States:

(9) That on various other occasions following the conclusion of the Treaty, as evidenced by official correspondence, Great Britain made use of expressions inconsistent with the claim to a right of regulation.

The Tribunal, unwilling to invest such expressions with an importance entitling them to affect the general question, considers that such con-

flicting or inconsistent expressions as have been exposed on either side are sufficiently explained by their relations to ephemeral phases of a controversy of almost secular duration, and should be held to be without direct effect on the principal and present issues.

Now with regard to the second contention involved in Question I, as to whether the right of regulation can be reasonably exercised by Great Britain without the consent of the United States:

Considering that the recognition of a concurrent right of consent in the United States would affect the independence of Great Britain, which would become dependent on the Government of the United States for the exercise of its sovereign right of regulation, and considering that such a co-dominium would be contrary to the constitution of both sovereign States; the burden of proof is imposed on the United States to show that the independence of Great Britain was thus impaired by international contract in 1818 and that a co-dominium was created.

For the purpose of such proof it is contended by the United States:

(10) That a concurrent right to co-operate in the making and enforcement of regulations is the only possible and proper security to their inhabitants for the enjoyment of their liberties of fishery, and that such a right must be held to be implied in the grant of those liberties by the Treaty under interpretation.

The Tribunal is unable to accede to this claim on the ground of a right so implied:

(*a*) Because every State has to execute the obligations incurred by Treaty *bona fide*, and is urged thereto by the ordinary sanctions of International law in regard to observance of Treaty obligations. Such sanctions are, for instance, appeal to public opinion, publication of correspondence, censure by Parliamentary vote, demand for arbitration with the odium attendant on a refusal to arbitrate, rupture of relations, reprisal, etc. But no reason has been shown why this Treaty, in this respect, should be considered as different from every other Treaty under which the right of a State to regulate the action of foreigners admitted by it on its territory is recognized;

(*b*) Because the exercise of such a right of consent by the United States would predicate an abandonment of its independence in this respect by Great Britain, and the recognition by the latter of a concurrent right of regulation in the United States. But the Treaty conveys only a liberty to take fish in common, and neither directly nor indirectly conveys a joint right of regulation;

(*c*) Because the Treaty does not convey a common right of fishery, but a liberty to fish in common. This is evidenced by the attitude of the

United States Government in 1823, with respect to the relations of Great Britain and France in regard to the fishery;

(*d*) Because if the consent of the United States were requisite for the fishery a general veto would be accorded them, the full exercise of which would be socially subversive and would lead to the consequence of an unregulatable fishery;

(*e*) Because the United States cannot by assent give legal force and validity to British legislation;

(*f*) Because the liberties to take fish in British territorial waters and to dry and cure fish on land in British territory are in principle on the same footing; but in practice a right of co-operation in the elaboration and enforcement of regulations in regard to the latter liberty (drying and curing fish on land) is unrealisable.

In any event, Great Britain, as the local sovereign, has the duty of preserving and protecting the fisheries. In so far as it is necessary for that purpose, Great Britain is not only entitled, but obliged, to provide for the protection and preservation of the fisheries, always remembering that the exercise of this right of legislation is limited by the obligation to execute the Treaty in good faith. This has been admitted by counsel and recognized by Great Britain in limiting the right of regulation to that of reasonable regulation. The inherent defect of this limitation of reasonableness, without any sanction except in diplomatic remonstrance, has been supplied by the submission to arbitral award as to existing regulations in accordance with Arts. II and III of the Special Agreement, and as to further regulation by the obligation to submit their reasonableness to an arbitral test in accordance with Art. IV of the Agreement.

It is finally contended by the United States:

That the United States did not expressly agree that the liberty granted to them could be subjected to any restriction that the grantor might choose to impose on the ground that in her judgment such restriction was reasonable. And that while admitting that all laws of a general character, controlling the conduct of men within the territory of Great Britain, are effective, binding and beyond objection by the United States, and competent to be made upon the sole determination of Great Britain or her colony, without accountability to anyone whomsoever; yet there is somewhere a line, beyond which it is not competent for Great Britain to go, or beyond which she cannot rightfully go, because to go beyond it would be an invasion of the right granted to the United States in 1818. That the legal effect of the grant of 1818 was not to leave the determination as to where that line is to be drawn to the uncontrolled judgment of the grantor, either upon the grantor's consideration as to what would be a reasonable exercise of its sovereignty over the British Empire, or upon the grantor's

consideration of what would be a reasonable exercise thereof towards the grantee.

But this contention is founded on assumptions, which this Tribunal cannot accept for the following reasons in addition to those already set forth:

(*a*) Because the line by which the respective rights of both Parties accruing out of the Treaty are to be circumscribed, can refer only to the right granted by the Treaty; that is to say to the liberty of taking, drying and curing fish by American inhabitants in certain British waters in common with British subjects, and not to the exercise of rights of legislation by Great Britain not referred to in the Treaty;

(*b*) Because a line which would limit the exercise of sovereignty of a State within the limits of its own territory can be drawn only on the ground of express stipulation, and not by implication from stipulations concerning a different subject-matter;

(*c*) Because the line in question is drawn according to the principle of international law that treaty obligations are to be executed in perfect good faith, therefore excluding the right to legislate *at will* concerning the subject-matter of the Treaty, and limiting the exercise of sovereignty of the States bound by a treaty with respect to that subject-matter to such acts as are consistent with the Treaty;

(*d*) Because on a true construction of the Treaty the question does not arise whether the United States agreed that Great Britain should retain the right to legislate with regard to the fisheries in her own territory; but whether the Treaty contains an abdication by Great Britain of the right which Great Britain, as the sovereign power, undoubtedly possesses, when the Treaty was made, to regulate those fisheries;

(*e*) Because the right to make reasonable regulations, not inconsistent with the obligations of the Treaty, which is all that is claimed by Great Britain, for a fishery which both Parties admit requires regulation for its preservation, is not a restriction of or an invasion of the liberty granted to the inhabitants of the United States. This grant does not contain words to justify the assumption that the sovereignty of Great Britain upon its own territory was in any way affected; nor can words be found in the Treaty transferring any part of that sovereignty to the United States. Great Britain assumed only duties with regard to the exercise of its sovereignty. The sovereignty of Great Britain over the coastal waters and territory of Newfoundland remains after the Treaty as unimpaired as it was before. But from the Treaty results an obligatory relation whereby the right of great Britain to exercise its right of sovereignty by making regulations is limited to such regulations as are made in good faith, and are not in violation of the Treaty;

(*f*) Finally to hold that the United States, the grantee of the fishing right, has a voice in the preparation of fishery legislation involves the recognition of a right in that country to participate in the internal legislation of Great Britain and her colonies, and to that extent would reduce these countries to a state of dependence.

While therefore unable to concede the claim of the United States as based on the Treaty, this Tribunal considers that such claim has been and is, to some extent, conceded in the relations now existing between the two Parties. Whatever may have been the situation under the Treaty of 1818 standing alone, the exercise of the right of regulation inherent in Great Britain has been, and is, limited by the repeated recognition of the obligations already referred to, by the limitations and liabilities accepted in the Special Agreement, by the unequivocal position assumed by Great Britain in the presentation of its case before this Tribunal, and by the consequent view of this Tribunal that it would be consistent with all the circumstances, as revealed by this record, as to the duty of Great Britain, that she should submit the reasonableness of any future regulation to such an impartial arbitral test, affording full opportunity therefor, as is hereafter recommended under the authority of Article IV of the Special Agreement, whenever the reasonableness of any regulation is objected to or challenged by the United States in the manner, and within the time hereinafter specified in the said recommendation.

Now therefore this Tribunal decides and awards as follows:

The right of Great Britain to make regulations without the consent of the United States, as to the exercise of the liberty to take fish referred to in Article I of the Treaty of October 20, 1818, in the form of municipal laws, ordinances or rules of Great Britain, Canada or Newfoundland is inherent to the sovereignty of Great Britain.

The exercise of that right by Great Britain is, however, limited by the said Treaty in respect of the said liberties therein granted to the inhabitants of the United States in that such regulations must be made bona fide and must not be in violation of the said Treaty.

Regulations which are (1) appropriate or necessary for the protection and preservation of such fisheries, or (2) desirable or necessary on grounds of public order and morals without unnecessarily interfering with the fishery itself, and in both cases equitable and fair as between local and American fishermen, and not so framed as to give unfairly an advantage to the former over the latter class, are not inconsistent with the obligation to execute the Treaty in good faith, and are therefore reasonable and not in violation of the Treaty.

For the decision of the question whether a regulation is or is not reasonable, as being or not in accordance with the dispositions of the

Treaty and not in violation thereof, the Treaty of 1818 contains no special provision. The settlement of differences in this respect that might arise thereafter was left to the ordinary means of diplomatic intercourse. By reason, however, of the form in which Question I is put, and by further reason of the admission of Great Britain by her counsel before this Tribunal that it is not now for either of the parties to the Treaty to determine the reasonableness of any regulation made by Great Britain, Canada or Newfoundland, the reasonableness of any such regulation, if contested, must be decided not by either of the parties, but by an impartial authority in accordance with the principles hereinabove laid down, and in the manner proposed in the recommendations made by the Tribunal in virtue of Article IV of the Agreement.

The Tribunal further decides that Article IV of the Agreement is, as stated by the counsel of the respective Parties at the argument, permanent in its effect, and not terminable by the expiration of the General Arbitration Treaty of 1908, between Great Britain and the United States.

In execution, therefore, of the responsibilities imposed upon this Tribunal in regard to Articles II, III and IV of the Special Agreement, we hereby pronounce in their regard as follows:

AS TO ARTICLE II

Pursuant to the provisions of this Article, hereinbefore cited, either Party has called the attention of this Tribunal to acts of the other claimed to be inconsistent with the true interpretation of the Treaty of 1818.

But in response to a request from the Tribunal, recorded in Protocol No. XXVI of 19th July, for an exposition of the grounds of such objections, the Parties replied as reported in Protocol No. XXX of 28th July to the following effect:

His Majesty's Government considered that it would be unnecessary to call upon the Tribunal for an opinion under the second clause of Article II, in regard to the executive act of the United States of America in sending warships to the territorial waters in question, in view of the recognized motives of the United States of America in taking this action and of the relations maintained by their representatives with the local authorities. And this being the sole act to which the attention of this Tribunal has been called by His Majesty's Government, no further action in their behalf is required from this Tribunal under Article II.

The United States of America presented a statement in which their claim that specific provisions of certain legislative and executive acts of the Governments of Canada and Newfoundland were inconsistent with the true interpretation of the Treaty of 1818 was based on the contention that these provisions were not "reasonable" within the meaning of Question I.

After calling upon this Tribunal to express an opinion on these acts, pursuant to the second clause of Article II, the United States of America pointed out in that statement that under Article III any question regarding the reasonableness of any regulation might be referred by the Tribunal to a Commission of expert specialists, and expressed an intention of asking for such reference under certain circumstances.

The Tribunal having carefully considered the counter-statement presented on behalf of Great Britain at the session of August 2nd, is of opinion that the decision on the reasonableness of these regulations requires expert information about the fisheries themselves and an examination of the practical effect of a great number of these provisions in relation to the conditions surrounding the exercise ot the liberty of fishery enjoyed by the inhabitants of the United States, as contemplated by Article III. No further action on behalf of the United States is therefore required from this Tribunal under Article II.

AS TO ARTICLE III

As provided in Article III, hereinbefore cited and above referred to, "any question regarding the reasonableness of any regulation, or otherwise, which requires an examination of the practical effect of any provisions surrounding the exercise of the liberty of fishery enjoyed by the inhabitants of the United States, or which requires expert information about the fisheries themselves, may be referred by this Tribunal to a Commission of expert specialists; one to be designated by each of the Parties hereto and the third, who shall not be a national of either Party, to be designated by the Tribunal."

The Tribunal now therefore calls upon the Parties to designate within one month their national Commissioners for the expert examination of the questions submitted.

As the third non-national Commissioner this Tribunal designates Doctor P. P. C. Hoek, Scientific adviser for the fisheries of the Netherlands, and if any necessity arises therefor a substitute may be appointed by the President of this Tribunal.

After a reasonable time, to be agreed on by the Parties, for the expert Commission to arrive at a conclusion, by conference, or, if necessary, by local inspection, the Tribunal shall, if convoked by the President at the request of either Party, thereupon at the earliest convenient date, reconvene to consider the report of the Commission, and if it be on the whole unanimous, shall incorporate it in the award. If not on the whole unanimous, i.e., on all points which in the opinion of the Tribunal are of essential importance, the Tribunal shall make its award as to the regulations concerned after consideration of the conclusions of the expert Commissioners and after hearing argument by Counsel.

But while recognizing its responsibilities to meet the obligations imposed on it under Article III of the Special Agreement, the Tribunal hereby recommends as an alternative to having recourse to a reconvention of this Tribunal, that the Parties should accept the unanimous opinion of the Commission or the opinion of the non-national Commissioner on any points in dispute as an arbitral award rendered under the provisions of Chapter IV of the Hague Convention of 1907.

AS TO ARTICLE IV

Pursuant to the provisions of this Article, hereinbefore cited, this Tribunal recommends for the consideration of the Parties the following rules and method of procedure under which all questions which may arise in the future regarding the exercise of the liberties above referred to may be determined in accordance with the principles laid down in this award.

1

All future municipal laws, ordinances or rules for the regulation of the fishery by Great Britain in respect of (1) the hours, days or seasons when fish may be taken on the Treaty coasts; (2) the method, means and implements used in the taking of fish or in carrying on fishing operations; (3) any other regulation of a similar character shall be published in the London Gazette two months before going into operation.

Similar regulations by Canada or Newfoundland shall be similarly published in the Canada Gazette and the Newfoundland Gazette respectively.

2

If the Government of the United States considers any such laws or regulations inconsistent with the Treaty of 1818, it is entitled to so notify the Government of Great Britain within the two months referred to in Rule No. 1.

3

Any law or regulation so notified shall not come into effect with respect to inhabitants of the United States until the Permanent Mixed Fishery Commission has decided that the regulation is reasonable within the meaning of this award.

4

Permanent Mixed Fishery Commissions for Canada and Newfoundland respectively shall be established for the decision of such questions as to the reasonableness of future regulations, as contemplated by Article IV of the Special Agreement; these Commissions shall consist of a national

expert appointed by either Party for five years. The third member shall not be a national of either party; he shall be nominated for five years by agreement of the Parties, or failing such agreement within two months he shall be nominated by Her Majesty the Queen of the Netherlands. The two national members shall be convoked by the Government of Great Britain within one month from the date of notification by the Government of the United States.

5

The two national members having failed to agree within one month, within another month the full Commission, under the presidency of the umpire, is to be convoked by Great Britain. It must deliver its decision, if the two Governments do not agree otherwise, at the latest in three months. The Umpire shall conduct the procedure in accordance with that provided in Chapter IV of the Convention for the Pacific Settlement of International Disputes, except in so far as herein otherwise provided.

6

The form of convocation of the Commission, including the terms of reference of the question at issue, shall be as follows: "The provision hereinafter fully set forth of an Act dated , published in the has been notified to the Government of Great Britain by the Government of the United States, under date of , as provided by the award of the Hague Tribunal of September 7th, 1910.

"Pursuant to the provisions of that award the Government of Great Britain hereby convokes the Permanent Mixed Fishery Commission for { Canada, / Newfoundland, } composed of Commissioner for the United States of America, and of Commissioner for { Canada, / Newfoundland, } which shall meet at and render a decision within one month as to whether the provision so notified is reasonable and consistent with the Treaty of 1818, as interpreted by the award of the Hague Tribunal of September 7th, 1910, and if not, in what respect it is unreasonable and inconsistent therewith.

"Failing an agreement on this question within one month the Commission shall so notify the Government of Great Britain in order that the further action required by that award may be taken for the decision of the above question.

"The provision is as follows:

7

The unanimous decision of the two national Commissioners, or the majority decision of the Umpire and one Commissioner, shall be final and binding."

QUESTION II

Have the inhabitants of the United States, while exercising the liberties referred to in said Article, a right to employ as members of the fishing crews of their vessels persons not inhabitants of the United States?

In regard to this question the United States claim in substance:

1. That the liberty assured to their inhabitants by the Treaty plainly includes the right to use all the means customary or appropriate for fishing upon the sea, not only ships and nets and boats, but crews to handle the ships and the nets and boats;
2. That no right to control or limit the means which these inhabitants shall use in fishing can be admitted unless it is provided in the terms of the Treaty and no right to question the nationality or inhabitancy of the crews employed is contained in the terms of the Treaty.

And Great Britain claims:

1. That the Treaty confers the liberty to inhabitants of the United States exclusively;
2. That the Governments of Great Britain, Canada or Newfoundland may, without infraction of the Treaty, prohibit persons from engaging as fishermen in American vessels.

Now considering (1) that the liberty to take fish is an economic right attributed by the Treaty; (2) that it is attributed to inhabitants of the United States, without any mention of their nationality; (3) that the exercise of an economic right includes the right to employ servants; (4) that the right of employing servants has not been limited by the Treaty to the employment of persons of a distinct nationality or inhabitancy; (5) that the liberty to take fish as an economic liberty refers not only to the individuals doing the manual act of fishing, but also to those for whose profit the fish are taken.

But, considering that the Treaty does not intend to grant to individual persons or to a class of persons the liberty to take fish in certain waters "in common," that is to say, in company, with individual British subjects,

in the sense that no law could forbid British subjects to take service on American fishing ships; (2) that the Treaty intends to secure to the United States a share of the fisheries designated therein, not only in the interest of a certain class of individuals, but also in the interest of both the United States and Great Britain, as appears from the evidence and notably from the correspondence between Mr. ADAMS and LORD BATHURST in 1815; (3) that the inhabitants of the United States do not derive the liberty to take fish directly from the Treaty, but from the United States Government as party to the Treaty with Great Britain and moreover exercising the right to regulate the conditions under which its inhabitants may enjoy the granted liberty; (4) that it is in the interest of the inhabitants of the United States that the fishing liberty granted to them be restricted to exercise by them and removed from the enjoyment of other aliens not entitled by this Treaty to participate in the fisheries; (5) that such restrictions have been throughout enacted in the British Statute of June 15, 1819, and that of June 3, 1824, to this effect, that no alien or stranger whatsoever shall fish in the waters designated therein, except in so far as by treaty thereto entitled, and that this exception will, in virtue of the Treaty of 1818, as hereinabove interpreted by this award, exempt from these statutes American fishermen fishing by the agency of non-inhabitant aliens employed in their service; (6) that the Treaty does not affect the sovereign right of Great Britain as to aliens, non-inhabitants of the United States, nor the right of Great Britain to regulate the engagement of British subjects, while these aliens or British subjects are on British territory.

Now therefore, in view of the preceding considerations this Tribunal is of opinion that the inhabitants of the United States while exercising the liberties referred to in the said article have a right to employ, as members of the fishing crews of their vessels, persons not inhabitants of the United States.

But in view of the preceding considerations the Tribunal, to prevent any misunderstanding as to the effect of its award, expresses the opinion that non-inhabitants employed as members of the fishing crews of United States vessels derive no benefit or immunity from the Treaty and it is so decided and awarded.

QUESTION III

Can the exercise by the inhabitants of the United States of the liberties referred to in the said Article be subjected, without the consent of the United States, to the requirements of entry or report at custom

houses or the payment of light or harbour or other dues, or to any other similar requirement or condition or exaction?

The Tribunal is of opinion as follows:

It is obvious that the liberties referred to in this question are those that relate to taking fish and to drying and curing fish on certain coasts as prescribed in the Treaty of October 20, 1818. The exercise of these liberties by the inhabitants of the United States in the prescribed waters to which they relate, has no reference to any commercial privileges which may or may not attach to such vessels by reason of any supposed authority outside the Treaty, which itself confers no commercial privileges whatever upon the inhabitants of the United States or the vessels in which they may exercise the fishing liberty. It follows, therefore, that when the inhabitants of the United States are not seeking to exercise the commercial privileges accorded to trading vessels for the vessels in which they are exercising the granted liberty of fishing, they ought not to be subjected to requirements as to report and entry at custom houses that are only appropriate to the exercise of commercial privileges. The exercise of the fishing liberty is distinct from the exercise of commercial or trading privileges and it is not competent for Great Britain or her colonies to impose upon the former exactions only appropriate to the latter. The reasons for the requirements enumerated in the case of commercial vessels, have no relation to the case of fishing vessels.

We think, however, that the requirement that American fishing vessels should report, if proper conveniences and an opportunity for doing so are provided, is not unreasonable or inappropriate. Such a report, while serving the purpose of a notification of the presence of a fishing vessel in the treaty waters for the purpose of exercising the treaty liberty, while it gives an opportunity for a proper surveillance of such vessel by revenue officers, may also serve to afford to such fishing vessel protection from interference in the exercise of the fishing liberty. There should be no such requirement, however, unless reasonably convenient opportunity therefor be afforded in person or by telegraph, at a custom house or to a customs official.

The Tribunal is also of opinion that light and harbour dues, if not imposed on Newfoundland fishermen, should not be imposed on American fishermen while exercising the liberty granted by the Treaty. To impose such dues on American fishermen only would constitute an unfair discrimination between them and Newfoundland fishermen and one inconsistent with the liberty granted to American fishermen to take fish, etc., "in common with thesu bjects of His Britannic Majesty."

Further, the Tribunal considers that the fulfilment of the requirement as to report by fishing vessels on arrival at the fishery would be greatly facilitated in the interests of both parties by the adoption of a system of registration, and distinctive marking of the fishing boats of both parties, analogous to that established by Articles V to XIII, inclusive, of the International Convention signed at the Hague, 8 May, 1882, for the regulation of the North Sea Fisheries.

The Tribunal therefore decides and awards as follows:

The requirement that an American fishing vessel should report, if proper conveniences for doing so are at hand, is not unreasonable, for the reasons stated in the foregoing opinion. There should be no such requirement, however, unless there be reasonably convenient opportunity afforded to report in person or by telegraph, either at a custom house or to a customs official.

But the exercise of the fishing liberty by the inhabitants of the United States should not be subjected to the purely commercial formalities of report, entry and clearance at a custom house, nor to light, harbour or other dues not imposed upon Newfoundland fishermen.

QUESTION IV

Under the provision of the said Article that the American fishermen shall be admitted to enter certain bays or harbours for shelter, repairs, wood, or water, and for no other purpose whatever, but that they shall be under such restrictions as may be necessary to prevent their taking, drying or curing fish therein or in any other manner whatever abusing the privileges thereby reserved to them, is it permissable to impose restrictions making the exercise of such privileges conditional upon the payment of light or harbour or other dues, or entering or reporting at custom houses or any similar conditions?

The Tribunal is of opinion that the provision in the first Article of the Treaty of October 20, 1818, admitting American fishermen to enter certain bays or harbours for shelter, repairs, wood and water, and for no other purpose whatever, is an exercise in large measure of those duties of hospitality and humanity which all civilized nations impose upon themselves and expect the performance of from others. The enumerated purposes for which entry is permitted all relate to the exigencies in which those who pursue their perilous calling on the sea may be involved. The proviso which appears in the first article of the said Treaty immediately after the so-called renunciation clause, was doubtless due to a recognition by Great Britain of what was expected from the humanity and civiliza-

tion of the then leading commercial nation of the world. To impose restrictions making the exercise of such privileges conditional upon the payment of light, harbour or other dues, or entering and reporting at custom houses, or any similar conditions would be inconsistent with the grounds upon which such privileges rest and therefore it is not permissible.

And it is decided and awarded that such restrictions are not permissible.

It seems reasonable, however, in order that these privileges accorded by Great Britain on these grounds of hospitality and humanity should not be abused, that the American fishermen entering such bays for any of the four purposes aforesaid and remaining more than 48 hours therein, should be required, if thought necessary by Great Britain or the Colonial Government, to report, either in person or by telegraph, at a custom house or to a customs official, if reasonably convenient opportunity therefor is afforded.

And it is so decided and awarded.

QUESTION V

From where must be measured the "three marine miles of any of the coasts, bays, creeks, or harbours" referred to in the said Article?

In regard to this question, Great Britain claims that the renunciation applies to all bays generally and

The United States contend that it applies to bays of a certain class or condition.

Now, considering that the Treaty used the general term "bays" without qualification, the Tribunal is of opinion that these words of the Treaty must be interpreted in a general sense as applying to every bay on the coast in question that might be reasonably supposed to have been considered as a bay by the negotiators of the Treaty under the general conditions then prevailing, unless the United States can adduce satisfactory proof that any restrictions or qualifications of the general use of the term were or should have been present to their minds.

And for the purpose of such proof the United States contend:

1°. That while a State may renounce the treaty right to fish in foreign territorial waters, it cannot renounce the natural right to fish on the High Seas.

But the Tribunal is unable to agree with this contention. Because though a State cannot grant rights on the High Seas it certainly can abandon the exercise of its right to fish on the High Seas within certain

definite limits. Such an abandonment was made with respect to their fishing rights in the waters in question by France and Spain in 1763. By a convention between the United Kingdom and the United States in 1846, the two countries assumed ownership over waters in Fuca straits at distances from the shore as great as 17 miles.

The United States contend moreover:

2°. That by the use of the term "liberty to fish" the United States manifested the intention to renounce the liberty in the waters referred to only in so far as that liberty was dependent upon or derived from a concession on the part of Great Britain, and not to renounce the right to fish in those waters where it was enjoyed by virtue of their natural right as an independent State.

But the Tribunal is unable to agree with this contention:

(*a*) Because the term "liberty to fish" was used in the renunciatory clause of the Treaty of 1818 because the same term had been previously used in the Treaty of 1783 which gave the liberty; and it was proper to use in the renunciation clause the same term that was used in the grant with respect to the object of the grant; and, in view of the terms of the grant, it would have been improper to use the term "right" in the renunciation. Therefore the conclusion drawn from the use of the term "liberty" instead of the term "right" is not justified;

(*b*) Because the term "liberty" was a term properly applicable to the renunciation which referred not only to fishing in the territorial waters but also to drying and curing on the shore. This latter right was undoubtedly held under the provisions of the Treaty and was not a right accruing to the United States by virtue of any principle of the international law.

3°. The United States also contend that the term "bays of His Britannic Majesty's Dominions" in the renunciatory clause must be read as including only those bays which were under the territorial sovereignty of Great Britain.

But the Tribunal is unable to accept this contention:

(*a*) Because the description of the coast on which the fishery is to be exercised by the inhabitants of the United States is expressed throughout the Treaty of 1818 in geographical terms and not by reference to political control; the Treaty describes the coast as contained between capes;

(*b*) Because to express the political concept of dominion as equivalent to sovereignty, the word "dominion" in the singular would have been an adequate term and not "dominions" in the plural; this latter term having a recognized and well settled meaning as descriptive of those portions of the Earth which owe political allegiance to His Majesty; e.g., "His Britannic Majesty's Dominions beyond the Seas."

4°. It has been further contended by the United States that the renunciation applies only to bays six miles or less in width *inter fauces terrae*, those bays only being territorial bays, because the three mile rule is, as shown by this Treaty, a principle of international law applicable to coasts and should be strictly and systematically applied to bays.

But the Tribunal is unable to agree with this contention:

(*a*) Because admittedly the geographical character of a bay contains conditions which concern the interests of the territorial sovereign to a more intimate and important extent than do those connected with the open coast. Thus conditions of national and territorial integrity, of defence, of commerce and of industry are all vitally concerned with the control of the bays penetrating the national coast line. This interest varies, speaking generally in proportion to the penetration inland of the bay; but as no principle of international law recognizes any specified relation between the concavity of the bay and the requirements for control by the territorial sovereignty, this Tribunal is unable to qualify by the application of any new principle its interpretation of the Treaty of 1818 as excluding bays in general from the strict and systematic application of the three mile rule; nor can this Tribunal take cognizance in this connection of other principles concerning the territorial sovereignty over bays such as ten mile or twelve mile limits of exclusion based on international acts subsequent to the Treaty of 1818 and relating to coasts of a different configuration and conditions of a different character;

(*b*) Because the opinion of jurists and publicists quoted in the proceedings conduce to the opinion that speaking generally the three mile rule should not be strictly and systematically applied to bays;

(*c*) Because the treaties referring to these coasts, antedating the Treaty of 1818, made special provisions as to bays, such as the Treaties of 1686 and 1713 between Great Britain and France, and especially the Treaty of 1778 between the United States and France. Likewise JAY's Treaty of 1794 Art. 25, distinguished bays from the space "within cannon-shot of the coast" in regard to the right of seizure in times of war. If the proposed Treaty of 1806 and the Treaty of 1818 contained no disposition to that effect, the explanation may be found in the fact that the first extended the marginal belt to five miles, and also in the circumstance that the American proposition of 1818 in that respect was not limited to "bays," but extended to "chambers formed by headlands" and to "five marine miles from a right line from one headland to another," a proposition which in the times of the Napoleonic wars would have affected to a very large extent the operations of the British navy;

(*d*) Because it has not been shown by the documents and corres-

pondence in evidence here that the application of the three mile rule to bays was present to the minds of the negotiators in 1818 and they could not reasonably have been expected either to presume it or to provide against its presumption;

(*e*) Because it is difficult to explain the words in Art. III of the Treaty under interpretation "country . . . . together with its bays, harbours and creeks" otherwise than that all bays without distinction as to their width were, in the opinion of the negotiators, part of the territory;

(*f*) Because from the information before this Tribunal it is evident that the three mile rule is not applied to bays strictly or systematically either by the United States or by any other Power;

(*g*) It has been recognized by the United States that bays stand apart, and that in respect of them territorial jurisdiction may be exercised farther than the marginal belt in the case of Delaware bay by the report of the United States Attorney General of May 19, 1793; and the letter of Mr. JEFFERSON to Mr. GENET of Nov. 8, 1793, declares the bays of the United States generally to be, "as being landlocked, within the body of the United States."

> 5°. In this latter regard it is further contended by the United States, that such exceptions only should be made from the application of the three mile rule to bays as are sanctioned by conventions and established usage; that all exceptions for which the United States of America were responsible are so sanctioned; and that His Majesty's Government are unable to provide evidence to show that the bays concerned by the Treaty of 1818 could be claimed as exceptions on these grounds either generally, or except possibly in one or two cases, specifically.

But the Tribunal while recognizing that conventions and established usage might be considered as the basis for claiming as territorial those bays which on this ground might be called historic bays, and that such claim should be held valid in the absence of any principle of international law on the subject; nevertheless is unable to apply this, *a contrario*, so as to subject the bays in question to the three mile rule, as desired by the United States:

(*a*) Because Great Britain has during this controversy asserted a claim to these bays generally, and has enforced such claim specifically in statutes or otherwise, in regard to the more important bays such as Chaleur, Conception and Miramichi;

(*b*) Because neither should such relaxations of this claim, as are in evidence, be construed as renunciations of it; nor should omissions to enforce the claim in regard to bays as to which no controversy arose, be so construed. Such a construction by this Tribunal would not only be

intrinsically inequitable but internationally injurious; in that it would discourage conciliatory diplomatic transactions and encourage the assertion of extreme claims in their fullest extent;

(*c*) Because any such relaxations in the extreme claim of Great Britain in its international relations are compensated by recognitions of it in the same sphere by the United States; notably in relations with France for instance in 1823 when they applied to Great Britain for the protection of their fishery in the bays on the western coast of Newfoundland, whence they had been driven by French war vessels on the ground of the pretended exclusive right of the French. Though they never asserted that their fishermen had been disturbed within the three mile zone, only alleging that the disturbance had taken place in the bays, they claimed to be protected by Great Britain for having been molested in waters which were, as Mr. RUSH stated "clearly within the jurisdiction and sovereignty of Great Britain."

6°. It has been contended by the United States that the words "coasts, bays, creeks or harbours." are here used only to express different parts of the coast and are intended to express and be equivalent to the word "coast," whereby the three marine miles would be measured from the sinuosities of the coast and the renunciation would apply only to the waters of bays within three miles.

But the Tribunal is unable to agree with this contention:

(*a*) Because it is a principle of interpretation that words in a document ought not to be considered as being without any meaning if there is not specific evidence to that purpose and the interpretation referred to would lead to the consequence, practically, of reading the words "bays, creeks and harbours" out of the Treaty; so that it would read "within three miles of any of the coasts" including therein the coasts of the bays and harbours;

(*b*) Because the word "therein" in the proviso—" restrictions necessary to prevent their taking, drying or curing fish therein" can refer only to "bays," and not to the belt of three miles along the coast; and can be explained only on the supposition that the words "bays, creeks and harbours" are to be understood in their usual ordinary sense and not in an artificially restricted sense of bays within the three mile belt;

(*c*) Because the practical distinction for the purpose of this fishery between coasts and bays and the exceptional conditions pertaining to the latter has been shown from the correspondence and the documents in evidence, especially the Treaty of 1783, to have been in all probability present to the minds of the negotiators of the Treaty of 1818;

(*d*) Because the existence of this distinction is confirmed in the same article of the Treaty by the proviso permitting the United States fishermen to enter bays for certain purposes;

(*e*) Because the word "coasts" is used in the plural form whereas the contention would require its use in the singular;

(*f*) Because the Tribunal is unable to understand the term "bays" in the renunciatory clause in other than its geographical sense, by which a bay is to be considered as an indentation of the coast, bearing a configuration of a particular character easy to determine specifically, but difficult to describe generally.

The negotiators of the Treaty of 1818 did not probably trouble themselves with subtle theories concerning the notion of "bays"; they most probably thought that everybody would know what was a bay. In this popular sense the term must be interpreted in the Treaty. The interpretation must take into account all the individual circumstances which for any one of the different bays are to be appreciated, the relation of its width to the length of penetration inland, the possibility and the necessity of its being defended by the State in whose territory it is indented; the special value which it has for the industry of the inhabitants of its shores; the distance which it is secluded from the highways of nations on the open sea and other circumstances not possible to enumerate in general.

For these reasons the Tribunal decides and awards:

In case of bays the three marine miles are to be measured from a straight line drawn across the body of water at the place where it ceases to have the configuration and characteristics of a bay. At all other places the three marine miles are to be measured following the sinuosities of the coast.

But considering the Tribunal cannot overlook that this answer to Question V, although correct in principle and the only one possible in view of the want of a sufficient basis for a more concrete answer, is not entirely satisfactory as to its practical applicability, and that it leaves room for doubts and differences in practice. Therefore the Tribunal considers it its duty to render the decision more practicable and to remove the danger of future differences by adjoining to it, a recommendation in virtue of the responsibilities imposed by Art. IV of the Special Agreement.

Considering, moreover, that in treaties with France, with the North German Confederation and the German Empire and likewise in the North Sea Convention, Great Britain has adopted for similar cases the rule that only bays of ten miles width should be considered as those wherein the fishing is reserved to nationals. And that in the course of the negotiations between Great Britain and the United States a similar rule has been on various occasions proposed and adopted by Great Britain in instructions

to the naval officers stationed on these coasts. And that though these circumstances are not sufficient to constitute this a principle of international law, it seems reasonable to propose this rule with certain exceptions, all the more that this rule with such exception has already formed the basis of an agreement between the two powers.

Now therefore this Tribunal in pursuance of the provisions of Art. IV hereby recommends for the consideration and acceptance of the High Contracting Parties the following rules and method of procedure for determining the limits of the bays hereinbefore enumerated.

1

In every bay not hereinafter specifically provided for the limits of exclusion shall be drawn three miles seaward from a straight line across the bay in the part nearest the entrance at the first point where the width does not exceed ten miles.

2

In the following bays where the configuration of the coast and the local climatic conditions are such that foreign fishermen when within the geographic headlands might reasonably and bona fide believe themselves on the high seas, the limits of exclusion shall be drawn in each case between the headlands hereinafter specified as being those at and within which such fishermen might be reasonably expected to recognize the bay under average conditions.

For the Baie des Chaleurs the line from the Light at Birch Point on Miscou Island to Macquereau Point Light: for the Bay of Miramichi, the line from the Light at Point Escuminac to the Light on the Eastern Point of Tabusintac Gully; for Egmont Bay, in Prince Edward Island, the line from the light at Cape Egmont to the light at West Point; and off St. Ann's Bay, in the Province of Nova Scotia, the line from the Light at Point Anconi to the nearest point on the opposite shore of the mainland.

For Fortune Bay, in Newfoundland, the line from Connaigre Head to the Light on the Southeasterly end of Brunet Island, thence to Fortune Head.

For or near the following bays the limits of exclusion shall be three marine miles seawards from the following lines, namely:

For or near Barrington Bay, in Nova Scotia, the line from the Light on Stoddart Island to the Light on the south point of Cape Sable, thence to the light at Baccaro Point; at Chedabucto and St. Peter's Bays, the line from Cranberry Island Light to Green Island Light, thence to

Point Rouge; for Mari Bay, the line from the Light on the East Point of Scatari Island to the Northeasterly Point of Cape Morien; and at Placentia Bay, in Newfoundland, the line from Latine Point, on the Eastern mainland shore, to the most Southerly Point of Red Island, thence by the most Southerly Point of Merasheen Island to the mainland.

Long Island and Bryer Island, on St. Mary's Bay, in Nova Scotia, shall, for the purpose of delimitation, be taken as the coasts of such bays.

It is understood that nothing in these rules refers either to the Bay of Fundy considered as a whole apart from its bays and creeks or as to the innocent passage through the Gut of Canso, which were excluded by the agreement made by exchange of notes between Mr. Bacon and Mr. Bryce dated February 21, 1909, and March 4, 1909; or to Conception Bay, which was provided for by the decision of the Privy Council in the case of the Direct United States Cable Company v. The Anglo American Telegraph Company, in which decision the United States have acquiesced.

QUESTION VI

Have the inhabitants of the United States the liberty under the said Article or otherwise, to take fish in the bays, harbours, and creeks on that part of the southern coast of Newfoundland which extends from Cape Ray to Rameau Islands, or on the western and northern coasts of Newfoundland from Cape Ray to Quirpon Islands or on the Magdalen Islands?

> In regard to this question, it is contended by the United States that the inhabitants of the United States have the liberty under Art. I of the Treaty of taking fish in the bays, harbours and creeks on that part of the Southern Coast of Newfoundland which extends from cape Ray to Rameau islands or on the western and northern coasts of Newfoundland from cape Ray to Quirpon islands and on the Magdalen islands. It is contended by Great Britain that they have no such liberty.

Now considering that the evidence seems to show that the intention of the Parties to the Treaty of 1818, as indicated by the records of the negotiations and by the subsequent attitude of the Governments was to admit the United States to such fishery, this Tribunal is of opinion that it is incumbent on Great Britain to produce satisfactory proof that the United States are not so entitled under the Treaty.

For this purpose Great Britain points to the fact that whereas the Treaty grants to American Fishermen liberty to take fish "on the coasts, bays, harbours, and creeks from Mount Joly on the Southern coast of

Labrador" the liberty is granted to the "coast" only of Newfoundland and to the "shore" only of the Magadalen islands; and argues that evidence can be found in the correspondence submitted indicating an intention to exclude Americans from Newfoundland bays on the Treaty Coast, and that no value would have been attached at that time by the United States Government to the liberty of fishing in such bays because there was no cod fishery there as there was in the bays of Labrador.

But the Tribunal is unable to agree with this contention:

(*a*) Because the words "part of the southern coast . . . from . . .to" and the words "Western and Northern Coast . . from . . . . to", clearly indicate one uninterrupted coast-line; and there is no reason to read into the words "coast" a contradistinction to bays, in order to exclude bays. On the contrary, as already held in the answer to Question V, the words "liberty, for ever, to dry and cure fish in any of the unsettled bays, harbours and creeks of the Southern part of the Coast of Newfoundland hereabove described," indicate that in the meaning of the Treaty, as in all the preceding treaties relating to the same territories, the words coast, coasts, harbours, bays, etc., are used, without attaching to the word "coast" the specific meaning of excluding bays. Thus in the provision of the Treaty of 1783 giving liberty "to take fish on such part of the coast of Newfoundland as British fishermen shall use; the word "coast" necessarily includes bays, because if the intention had been to prohibit the entering of the bays for fishing the following words "but not to dry or cure the same on that island," would have no meaning. The contention that in the Treaty of 1783 the word "bays" is inserted lest otherwise Great Britain would have had the right to exclude the Americans to the three mile line, is inadmissible, because in that Treaty that line is not mentioned;

(*b*) Because the correspondence between Mr. Adams and Lord Bathurst also shows that during the negotiations for the Treaty the United States demanded the former rights enjoyed under the Treaty of 1783, and that Lord Bathurst in the letter of 30th October, 1815, made no objection to granting those "former rights" "placed under some modifications," which latter did not relate to the right of fishing in bays, but only to he "pre-occupation of British harbours and creeks by the fishing vessels of the United States and the forcible exclusion of British subjects where the fishery might be most advantageously conducted," and "to the clandestine introduction of prohibited goods into the British colonies." It may be therefore assumed that the word "coast" is used in both Treaties in the same sense, including bays;

(*c*) Because the Treaty expressly allows the liberty to dry and cure in the unsettled bays, etc., of the southern part of the coast of Newfoundland, and this shows that, *a fortiori* the taking of fish in those bays is also

allowed; because the fishing liberty was a lesser burden than the grant to cure and dry, and restrictive clauses never refer to fishing in contradistinction to drying, but always to drying in contradistinction to fishing. Fishing is granted without drying, never drying without fishing;

(*d*) Because there is not sufficient evidence to show that the enumeration of the component parts of the coast of Labrador was made in order to discriminate between the coast of Labrador and coast of Newfoundland;

(*e*) Because the statement that there is no codfish in the bays of Newfoundland and that the Americans only took interest in the codfishery is not proved; and evidence to the contrary is to be found in Mr. JOHN ADAMS' Journal of Peace Negotiations of November 25, 1782;

(*f*) Because the Treaty grants the right to take fish of every kind, and not only codfish;

(*g*) Because the evidence shows that, in 1823, the Americans were fishing in Newfoundland bays and that Great Britain when summoned to protect them against expulsion therefrom by the French did not deny their right to enter such bays.

Therefore this Tribunal is of opinion that American inhabitants are entitled to fish in the bays, creeks and harbours of the Treaty coasts of Newfoundland and the Magdalen islands, and it is so decided and awarded.

QUESTION VII

Are the inhabitants of the United States whose vessels resort to the Treaty Coasts for the purpose of exercising the liberties referred to in Article I of the Treaty of 1818 entitled to have for those vessels, when duly authorized by the United States in that behalf, the commercial privileges on the Treaty Coasts accorded by agreement or otherwise to United States trading vessels generally?

Now assuming that commercial privileges on the Treaty Coasts are accorded by agreement or otherwise to United States trading vessels generally, without any exception, the inhabitants of the United States, whose vessels resort to the same coasts for the purpose of exercising the liberties referred to in Article I of the Treaty of 1818, are entitled to have for those vessels when duly authorized by the United States in that behalf, the above mentioned commercial privileges, the Treaty containing nothing to the contrary. But they cannot at the same time and during the same voyage exercise their Treaty rights and enjoy their commercial privileges, because Treaty rights and commercial privileges are submitted to different rules, regulations and restraints.

For these reasons this Tribunal is of opinion that the inhabitants of the United States are so entitled in so far as concerns this Treaty, there being nothing in its provisions to disentitle them provided the Treaty liberty of fishing and the commercial privileges are not exercised concurrently and it is so decided and awarded.

Done at the Hague, in the Permanent Court of Arbitration, in triplicate original, September 7, 1910.

H. LAMMASCH.
A. F. DE SAVORNIN LOHMAN.
GEORGE GRAY.
C. FITZPATRICK.
LUIS M. DRAGO.

Signing the Award, I state pursuant to Article IX clause 2 of the Special Agreement my dissent from the majority of the Tribunal in respect to the considerations and enacting part of the Award as to Question V.

Grounds for this dissent have been filed at the International Bureau of the Permanent Court of Arbitration.

LUIS M. DRAGO.

GROUNDS FOR THE DISSENT TO THE AWARD ON QUESTION V BY DR. LUIS M. DRAGO

Counsel for Great Britain have very clearly stated that according to their contention the territoriality of the bays referred to in the Treaty of 1818 is immaterial because whether they are or are not territorial, the United States should be excluded from fishing in them by the terms of the renunciatory clause, which simply refers to "bays, creeks or harbours of His Britannic Majesty's Dominions" without any other qualification or description. If that were so, the necessity might arise of discussing whether or not a nation has the right to exclude another by contract or otherwise from any portion or portions of the high seas. But in my opinion the Tribunal need not concern itself with such general question, the wording of the Treaty being clear enough to decide the point at issue.

Article I begins with the statement that differences have arisen respecting the liberty claimed by the United States for the inhabitants thereof to take, dry and cure fish on "certain coasts, bays, harbours and

creeks, of His Britannic Majesty's Dominions in America," and then proceeds to locate the specific portions of the coast with its corresponding indentations, in which the liberty of taking, drying and curing fish should be exercised. The renunciatory clause, which the Tribunal is called upon to construe, runs thus: "And the United States hereby renounce, forever, any liberty heretofore enjoyed or claimed by the inhabitants thereof, to take, dry or cure fish on, or within three marine miles of any of the coasts, bays, creeks or harbours of His Britannic Majesty's Dominions in America not included within the above mentioned limits." This language does not lend itself to different construction. If the bays in which the liberty has been renounced are those "of His Britannic Majesty's Dominions in America," they must necessarily be territorial bays, because in so far as they are not so considered they should belong to the high seas and consequently form no part of His Britannic Majesty's Dominions, which, by definition, do not extend to the high seas. It cannot be said, as has been suggested, that the use of the word "dominions," in the plural, implies a different meaning than would be conveyed by the same term as used in the singular, so that in the present case, "the British dominions in America" ought to be considered as a mere geographical expression, without reference to any right of sovereignty or *dominion*. It seems to me, on the contrary, that "dominions," or "possessions," or "estates," or such other equivalent terms, simply designate the places over which the "dominion" or property rights are exercised. Where there is no possibility of appropriation or dominion, as on the high seas, we cannot speak of dominions. The "dominions" extend exactly to the point which the "dominion" reaches; they are simply the actual or physical thing over which the abstract power or authority, the *right*, as given to the proprietor or the ruler, applies. The interpretation as to the territoriality of the bays as mentioned in the renunciatory clause of the Treaty appears stronger when considering that the United States specifically renounced the "liberty," not the "right" to fish or to cure and dry fish. "The United States renounced, forever, any *liberty* heretofore enjoyed or claimed, to take, cure or dry fish on, or within three marine miles of any of the coasts, bays, creeks or harbours of His Britannic Majesty's Dominions in America." It is well known that the negotiators of the Treaty of 1783 gave a very different meaning to the terms *liberty* and *right*, as distinguished from each other. In this connection Mr. ADAMS' Journal may be recited. To this Journal the British Counter Case refers in the following terms: "From an entry in Mr. ADAMS' Journal it appears he drafted an article by which he distinguished the *right* to take fish (both on the high seas and on the shores) and the *liberty* to take and cure fish on the land. But on the following day he presented to the British negotiators a draft in which he distinguishes between the *right* to take fish on the high seas and the *liberty* to take fish on the *coasts*, and to dry and cure fish on the land****. The

British Commissioner called attention to the distinction thus suggested by Mr. ADAMS and proposed that the word *liberty* should be applied to the privileges both on the water and on the land. Mr. ADAMS thereupon rose up and made a vehement protest, as is recorded in his diary, against the suggestion that the United States enjoyed the fishing on the banks of Newfoundland by any other title than that of *right.***** The application of the word *liberty* to the coast fishery was left as Mr. ADAMS proposed." "The incident, proceeds the British Case, is of importance, since it shows that the difference between the two phrases was intentional." (British Counter Case, page 17). And the British Argument emphasizes again the difference. "More cogent still is the distinction between the words *right* and *liberty*. The word *right* is applied to the sea fisheries, and the word *liberty* to the shore fisheries. The history of the negotiations shows that this distinction was advisedly adopted." If then a *liberty* is a grant and not the recognition of a *right*; if, as the British Case, Counter Case and Argument recognize, the United States had the right to fish in the open sea in contradistinction with the *liberty* to fish near the shores or portions of the shores, and if what has been renounced in the words of the treaty is the *liberty* to fish on, or within three miles of the bays, creeks and harbours of His Britannic Majesty's Dominions, it clearly follows that such *liberty* and the corresponding renunciation refers only to such portions of the bays which were under the sovereignty of Great Britain and not to such other portions, if any, as form part of the high seas.

And thus it appears that far from being immaterial the territoriality of bays is of the utmost importance. The Treaty not containing any rule or indication upon the subject, the Tribunal cannot help a decision as to this point, which involves the second branch of the British contention that all so-called bays are not only geographical but wholly territorial as well, and subject to the jurisdiction of Great Britain. The situation was very accurately described on almost the same lines as above stated by the British Memorandum sent in 1870 by the EARL OF KIMBERLEY to Governor Sir JOHN YOUNG: "The right of Great Britain to exclude American fishermen from waters within three miles of the coasts is unambiguous, and, it is believed, uncontested. But there appears to be some doubt what are the waters described as within three miles of bays, creeks or harbours. When a bay is less than six miles broad its waters are within the three mile limit, and therefore clearly within the meaning of the Treaty; *but when it is more than that breadth, the question arises whether it is a bay of Her Britannic Majesty's Dominions.* This is a question which has to be considered in each particular case with regard to international law and usage. When such a bay is not a bay of Her Majesty's dominions, the American fishermen shall be entitled to fish in it, except within three marine miles of the 'coast'; when it is a bay of Her Majesty's dominions they will not be entitled to fish

within three miles of it, that is to say (it is presumed) within three miles of a line drawn from headland to headland." (American Case Appendix, page 629).

Now, it must be stated in the first place that there does not seem to exist any general rule of international law which may be considered final, even in what refers to the marginal belt of territorial waters. The old rule of the cannon-shot, crystallized into the present three marine miles measured from low water mark, may be modified at a later period inasmuch as certain nations claim a wider jurisdiction and an extension has already been recommended by the Institute of International Law. There is an obvious reason for that. The marginal strip of territorial waters based originally on the cannon-shot, was founded on the necessity of the riparian State to protect itself from outward attack, by providing something in the nature of an insulating zone, which very reasonably should be extended with the accrued possibility of offense due to the wider range of modern ordnance. In what refers to bays, it has been proposed as a general rule (subject to certain important exceptions) that the marginal belt of territorial waters should follow the sinuosities of the coast more or less in the manner held by the United States in the present contention, so that the marginal belt being of three miles, as in the Treaty under consideration, only such bays should be held as territorial as have an entrance not wider than six miles. (See Sir THOMAS BARCLAY'S Report to Institute of International Law, 1894, page 129, in which he also strongly recommends these limits). This is the doctrine which WESTLAKE, the eminent English writer on International Law, has summed up in very few words: "As to bays," he says, "if the entrance to one of them is not more than twice the width of the littoral sea enjoyed by the country in question,—that is, not more than six sea miles in the ordinary case, eight in that of Norway, and so forth—there is no access from the open sea to the bay except through the territorial water of that country, and the inner part of the bay will belong to that country no matter how widely it may expand. The line drawn from shore to shore at the part where, in approaching from the open sea, the width first contracts to that mentioned, will take the place of the line of low water, and the littoral sea belonging to the State will be measured outwards from that line to the distance of three miles or more, proper to the State"; (WESTLAKE, Vol. I, page 187). But the learned author takes care to add: "But although this is the general rule it often meets with an exception in the case of bays which penetrate deep into the land and are called gulfs. Many of these are recognized by immemorial usage as territorial sea of the States into which they penetrate, notwithstanding that their entrance is wider than the general rule for bays would give as a limit for such appropriation." And he proceeds to quote as examples of this kind the Bay of Conception in Newfoundland, which he considers as wholly British, Chesa-

peake and Delaware Bays, which belong to the United States, and others (*Ibid*, page 188.) The Institute of International Law, in its annual meeting of 1894, recommended a marginal belt of six miles for the general line of the coast and as a consequence established that for bays the line should be drawn up across at the nearest portion of the entrance toward the sea where the distance between the two sides do not exceed twelve miles. But the learned association very wisely added a proviso to the effect, "that bays should be so considered and measured *unless a continuous and established usage* has sanctioned a greater breadth." Many great authorities are agreed as to that. Counsel for the United States proclaimed the right to the exclusive jurisdiction of certain bays, no matter what the width of their entrance should be, when the littoral nation has asserted its right to take it into their jurisdiction upon reasons which go always back to the doctrine of protection. LORD BLACKBURN, one of the most eminent of English judges in delivering the opinion of the Privy Council about Conception Bay in Newfoundland, adhered to the same doctrine when he asserted the territoriality of that branch of the sea, giving as a reason for such finding "that the British Government for a long period had exercised dominion over this bay and its claim had been acquiesced in by other nations, so as to show that the bay had been for a long time occupied exclusively by Great Britain, a circumstance which, in the tribunals of any country, would be very important." "And moreover," he added, "the British Legislature has, by Acts of Parliament, declared it to be part of the British territory, and part of the country made subject to the legislation of Newfoundland." (Direct U. S. Cable Co. v. The Anglo-American Telegraph Co., Law Reports, 2 Appeal Cases, 374.)

So it may be safely asserted that a certain class of bays, which might be properly called the historical bays such as Chesapeake Bay and Delaware Bay in North America and the great estuary of the River Plate in South America, form a class distinct and apart and undoubtedly belong to the littoral country, whatever be their depth of penetration and the width of their mouths, when such country has asserted its sovereignty over them, and particular circumstances such as geographical configuration, immemorial usage and above all, the requirements of self-defense, justify such a pretension. The right of Great Britain over the bays of Conception, Chaleur and Miramichi are of this description. In what refers to the other bays, as might be termed the common, ordinary bays, indenting the coasts, over which no special claim or assertion of sovereignty has been made, there does not seem to be any other general principle to be applied than the one resulting from the custom and usage of each individual nation as shown by their Treaties and their general and time honored practice.

The well known words of BYNKERSHOCK might be very appropriately

recalled in this connection when so many and divergent opinions and authorities have been recited: "The common law of nations," he says, "can only be learnt from reason and custom. I do not deny that authority may add weight to reason, but I prefer to seek it in a constant custom of concluding treaties in one sense or another and in examples that have occurred in one country or another." (Questions Jure Publici, Vol. 1, Cap. 3)

It is to be borne in mind in this respect that the Tribunal has been called upon to decide as the subject matter of this controversy, the construction to be given to the fishery Treaty of 1818 between Great Britain and the United States. And so it is that from the usage and the practice of Great Britain in this and other like fisheries and from Treaties entered into by them with other nations as to fisheries, may be evolved the right interpretation to be given to the particular convention which has been submitted. In this connection the following Treaties may be recited:

Treaty between Great Britain and France. 2nd August, 1839. It reads as follows:

Article IX. The subjects of Her Britannic Majesty shall enjoy the exclusive right of fishery within the distance of three miles from low water mark along the whole extent of the coasts of the British Islands.

It is agreed that the distance of three miles fixed as the general limit for the exclusive right of fishery upon the coasts of the two countries shall, with respect to bays, the mouths of which do not exceed ten miles in width, be measured from a straight line drawn from headland to headland.

Article X. It is agreed and understood, that the miles mentioned in the present Convention are geographical miles, whereof 60 make a degree of latitude.

(HERTSLETT'S Treaties and Conventions, Vol. V, p. 89.)

Regulations between Great Britain and France. 24th May, 1843.

Art. II. The limits, within which the general right of fishery is exclusively reserved to the subjects of the two kingdoms respectively, are fixed (with the exception of those in Granville Bay) at three miles distance from low water mark.

With respect to bays, the mouths of which do not exceed ten miles in width, the three mile distance is measured from a straight line drawn headland to headland.

Art. III. The miles mentioned in the present regulations are geographical miles, of which 60 make a degree of latitude.

(HERTSLETT, Vol. VI, p. 416.)

Treaty between Great Britain and France. November 11, 1867.

Art. I. British fishermen shall enjoy the exclusive right of fishery within the distance of three miles from low water mark, along the whole extent of the coasts of the British Islands.

The distance of three miles fixed as the general limit for the exclusive right of fishery upon the coasts of the two countries shall, with respect to bays, the mouths of which do not exceed ten miles in width, be measured from a straight line drawn from headland to headland.

The miles mentioned in the present convention are geographical miles whereof 60 make a degree of latitude.

(HERTSLETT'S Treaties, Vol. XII, p. 1126, British Case App. p. 38.)

Great Britain and North German Confederation. British notice to fishermen by the Board of Trade. Board of Trade, November, 1868.

Her Majesty's Government and the North German Confederation having come to an agreement respecting the regulations to be observed by British fishermen fishing off the coasts of the North German Confederation, the following notice is issued for the guidance and warning of British fishermen:

1. The exclusive fishery limits of the German Empire are designated by the Imperial Government as follows: that tract of the sea which extends to a distance of three sea miles from the extremest limits which the ebb leaves dry of the German North Sea Coast of the German Islands or flats lying before it, as well as those bays and incurvations of the coast which are ten sea miles or less in breadth reckoned from the extremest points of the land and the flats, must be considered as under the territorial sovereignty of North Germany.

(HERTSLETT'S Treaties, Vol. XIV, p. 1055.)

Great Britain and German Empire. British Board of Trade, December, 1874.

(Same recital referring to an arrangement entered into between Her Britannic Majesty and the German Government.)

Then the same articles follow with the alteration of the words "German Empire" for "North Germany".

(HERSTLETT'S, Vol. XIV, p. 1058.)

Treaty between Great Britain, Belgium, Denmark, France, Germany and the *Netherlands* for regulating the police of the North Sea Fisheries, May 6, 1882.

II. Les pêcheurs nationaux jouiront du droit exclusif de pêche dans le rayon de 3 milles, à partir de la laisse de basse mer, le long de toute l'étendue des côtes de leurs pays respectifs, ainsi que des îles et des bancs qui en dépendent.

Pour les baies le rayon de 3 milles sera mesuré à partir d'une ligne droite, tirée, en travers de la baie, dans la partie la plus rapprochée de l'entrée, au premier point où l'ouverture n'excédera pas 10 milles.

(HERSTLETT'S, Vol. XV, p. 794.)

British Order in Council, October 23, 1877.

Prescribes the obligation of not concealing or effacing numbers or marks on boats, employed in fishing or dredging for purposes of sale on the coasts of England, Wales, Scotland and the Islands of Guernsey, Jersey, Alderney, Sark and Man, and not going outside:

(*a*) The distance of three miles from low water mark along the whole extent of the said coasts:

(b) In case of bays less than 10 miles wide the line joining the headlands of said bays.

(HERTSLETT'S Vol. XIV, p. 1032.)

To this list may be added the unratified Treaty of 1888 between Great Britain and the United States which is so familiar to the Tribunal. Such unratified Treaty contains an authoritative interpretation of the Convention of October 20, 1818, *sub-judice*: "The three marine miles mentioned in Article I of the Convention of October 20, 1818, shall be measured seaward from low-water mark; but at every bay, creek or harbour, not otherwise specifically provided for in this Treaty, such three marine miles shall be measured seaward from a straight line drawn across the bay, creek or harbour, in the part nearest the entrance at the first point where the width does not exceed ten marine miles," which is recognizing the exceptional bays as aforesaid and laying the rule for the general and common bays.

It has been suggested that the Treaty of 1818 ought not to be studied as hereabove in the light of any Treaties of a later date, but rather to be referred to such British International Conventions as preceded it and clearly illustrate, according to this view, what were, at the time, the principles maintained by Great Britain as to their sovereignty over the sea and over the coast and the adjacent territorial waters. In this connection the Treaties of 1686 and 1713 with France and of 1763 with France and Spain have been recited and offered as examples also of exclusion of nations by agreement from fishery rights on the high seas. I cannot partake of such a view. The treaties of 1686, 1713 and 1763 can hardly be understood with respect to this, otherwise than as examples of the wild, obsolete claims over the common ocean which all nations have of old abandoned with the progress of an enlightened civilization. And if certain nations accepted long ago to be excluded by convention

from fishing on what is to-day considered a common sea, it is precisely because it was then understood that such tracts of water, now free and open to all, were the exclusive property of a particular power, who, being the owners, admitted or excluded others from their use. The treaty of 1818 is in the meantime one of the few which mark an era in the diplomacy of the world. As a matter of fact it is the very first which commuted the rule of the cannon-shot into the three marine miles of coastal jurisdiction. And it really would appear unjustified to explain such historic document, by referring it to international agreements of a hundred and two hundred years before when the doctrine of SELDEN'S *Mare Clausum* was at its height and when the coastal waters were fixed at such distances as sixty miles, or a hundred miles, or two days' journey from the shore and the like. It seems very appropriate, on the contrary, to explain the meaning of the Treaty of 1818 by comparing it with those which immediately followed and established the same limit of coastal jurisdiction. As a general rule a treaty of a former date may be very safely construed by referring it to the provisions of like Treaties made by the same nation on the same matter at a later time. Much more so when, as occurs in the present case, the later Conventions, with no exception, starting from the same premise of the three miles coastal jurisdiction arrive always to a uniform policy and line of action in what refers to bays. As a matter of fact all authorities approach and connect the modern fishery Treaties of Great Britain and refer them to the Treaty of 1818. The second edition of KLUBER, for instance, quotes in the same sentence the Treaties of October 20, 1818, and August 2, 1839, as fixing a distance of three miles from low water mark for coastal jurisdiction. And FIORI, the well-known Italian jurist, referring to the same marine miles of coastal jurisdiction, says: "This rule recognized as early as the Treaty of 1818 between the United States and Great Britain, and that between Great Britain and France in 1839, has again been admitted in the Treaty of 1867." (Nouveau droit International Public, Paris, 1885, Section 803.)

This is only a recognition of the permanency and the continuity of States. The Treaty of 1818 is not a separate fact unconnected with the later policy of Great Britain. Its negotiators were not parties to such International Convention and their powers disappeared as soon as they signed the document on behalf of their countries. The parties to the Treaty of 1818 were the United States and Great Britain, and what Great Britain meant in 1818 about bays and fisheries, when they for the first time fixed a marginal jurisdiction of three miles, can be very well explained by what Great Britain, the same permanent political entity, understood in 1839, 1843, 1867, 1874, 1878 and 1882, when fixing the very same zone of territorial waters. That a bay in Europe should be considered as different from a bay in America and subject to other principles of

international law cannot be admitted in the face of it. What the practice of Great Britain has been outside the Treaties is very well known to the Tribunal, and the examples might be multiplied of the cases in which that nation has ordered its subordinates to apply to the bays on these fisheries the ten mile entrance rule or the six miles according to the occasion. It has been repeatedly said that such have been only relaxations of the strict right, assented to by Great Britain in order to avoid friction on certain special occasions. That may be. But it may also be asserted that such relaxations have been very many and that the constant, uniform, never contradicted, practice of concluding fishery Treaties from 1839 down to the present day, in all of which the ten miles entrance bays are recognized, is the clear sign of a policy. This policy has but very lately found a most public, solemn and unequivocal expression. "On a question asked in Parliament on the 21st of February, 1907," says PITT CORBETT, a distinguished English writer, "with respect to the Moray Firth Case, it was stated that, according to the view of the Foreign Office, the Admiralty, the Colonial Office, the Board of Trade and the Board of Agriculture and Fisheries, the term 'territorial waters' was deemed to include waters extending from the coast line of any part of the territory of a State to three miles from the low water mark of such coast line and the waters of all bays, the entrance to which is not more than *six miles*, and of which the entire land boundary forms part of the territory of the same state." (PITT CORBETT Cases and Opinions on International Law, Vol. I, p. 143.)

Is there a contradiction between these six miles and the ten miles of the treaties just referred to? Not at all. The six miles are the consequence of the three miles marginal belt of territorial waters in their coincidence from both sides at the inlets of the coast and the ten miles far from being an arbitrary measure are simply an extension, a margin given for convenience to the strict six miles with fishery purposes. Where the miles represent sixty to a degree in latitude the ten miles are besides the sixth part of the same degree. The American Government in reply to the observations made to Secretary BAYARD'S Memorandum of 1888, said very precisely: "The width of ten miles was proposed not only because it had been followed in Conventions between many other powers, but also because it was deemed reasonable and just in the present case; this Government recognizing the fact that while it might have claimed a width of six miles as a basis of settlement, fishing within bays and harbours only slightly wider would be confined to areas so narrow as to render it practically valueless and almost necessarily expose the fishermen to constant danger of carrying their operations into forbidden waters." (British Case Appendix, page 416). And Professor JOHN BASSET MOORE, a recognized authority on International law, in a communication addressed to the Insti-

tute of International Law, said very forcibly: "Since you observe that there does not appear to be any convincing reason to prefer the ten mile line in such a case to that of double three miles, I may say that there have been supposed to exist reasons both of convenience and of safety. The ten mile line has been adopted in the cases referred to as a practical rule. The transgression of an encroachment upon territorial waters by fishing vessels is generally a grave offence, involving in many instances the forfeiture of the offending vessel, and it is obvious that the narrower the space in which it is permissible to fish the more likely the offence is to be committed. In order, therefore, that fishing may be practicable and safe and not constantly attended with the risk of violating territorial waters, it has been thought to be expedient not to allow it where the extent of free waters between the three miles drawn on each side of the bay is less than four miles. This is the reason of the ten mile line. Its intention is not to hamper or restrict the right to fish, but to render its exercise practicable and safe. When fishermen fall in with a shoal of fish, the impulse to follow it is so strong as to make the possibilities of transgression very serious within narrow limits of free waters. Hence it has been deemed wiser to exclude them from space less than four miles each way from the forbidden lines. In spaces less than this operations are not only hazardous, but so circumscribed as to render them of little practical value." (Annuaire de l'Institut de Droit International, 1894, p. 146.)

So the use of the ten mile bays so constantly put into practice by Great Britain in its fishery Treaties has its root and connection with the marginal belt of three miles for the territorial waters. So much so that the Tribunal having decided not to adjudicate in this case the ten mile entrance to the bays of the Treaty of 1818, this will be the only one exception in which the ten miles of the bays do not follow as a consequence the strip of three miles of territorial waters, the historical bays and estuaries always excepted.

And it is for that reason that a usage so firmly and for so long a time established ought, in my opinion, to be applied to the construction of the Treaty under consideration, much more so, when custom, one of the recognized sources of law, international as well as municipal, is supported in this case by reason and by the acquiescence and the practice of many nations.

The Tribunal has decided that: "In case of bays the three miles (of the Treaty) are to be measured from a straight line drawn across the body of water at the place where it ceases to have the configuration characteristic of a bay. At all other places the three miles are to be measured following the sinuosities of the coast." But no rule is laid out or general principle evolved for the parties to know what the nature of such configuration is or

by what methods the points should be ascertained from which the bay should lose the characteristics of such. There lies the whole contention and the whole difficulty, not satisfactorily solved, to my mind, by simply recommending, without the scope of the award and as a system of procedure for resolving future contestations under Article IV of the Treaty of Arbitration, a series of lines, which practical as they may be supposed to be, cannot be adopted by the Parties without concluding a new Treaty.

These are the reasons for my dissent, which I much regret, on Question V.

Done at the Hague, September 7, 1910.

LUIS M. DRAGO.

THE CANADIAN OYSTER INDUSTRY

By M. J. Patton

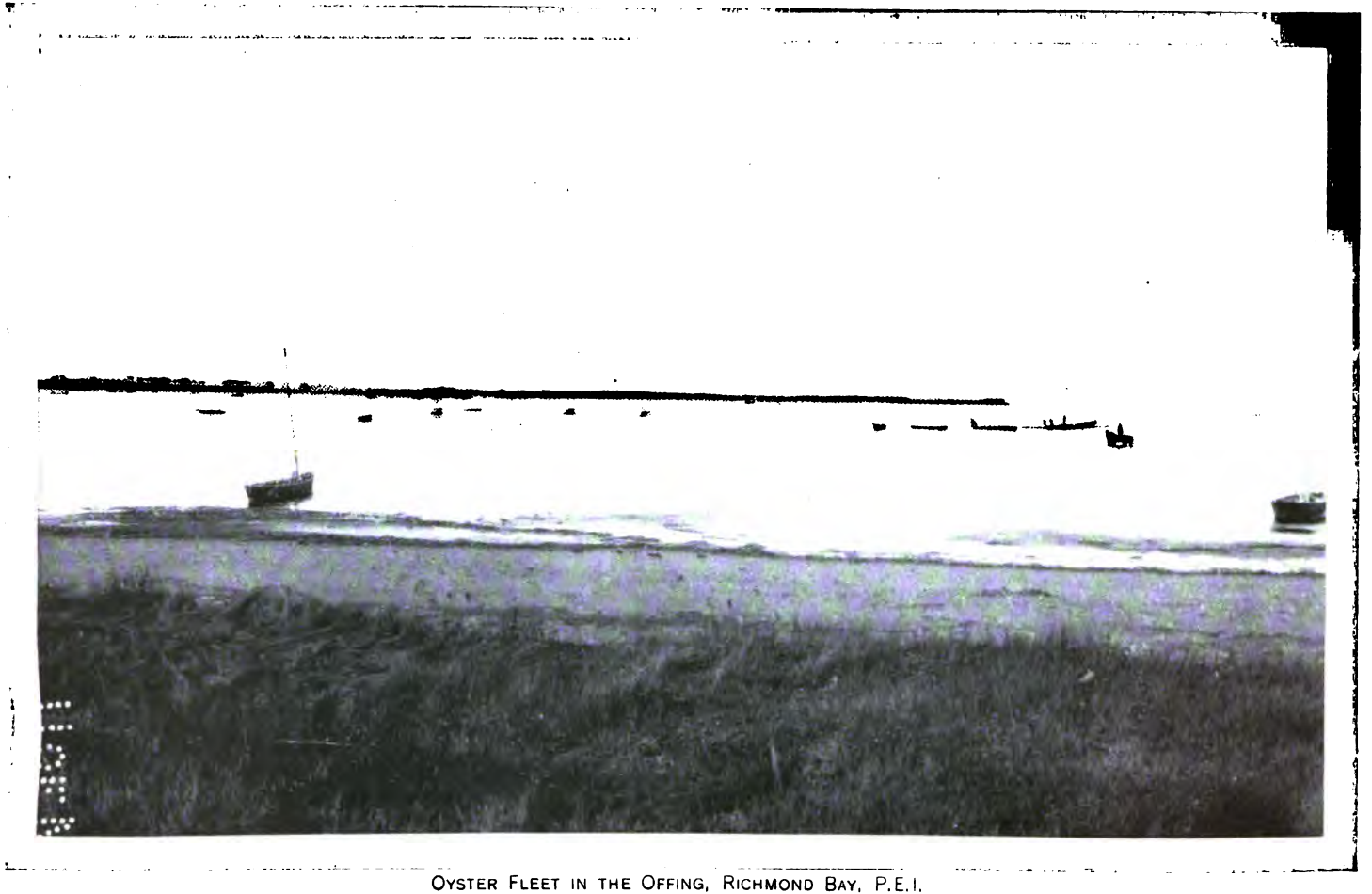
Assistant Secretary of the Commission of Conservation

The Canadian oyster industry is one which is fast dying out. At one time, the supply of oysters was thought to be inexhaustible; but, like nearly all other resources of which this has been predicated, ruthless exploitation and the demands of an increasing population have reduced it to the verge of depletion. Years ago only the larger and more prolific beds were fished; but the decreasing supply has, year by year, compelled the fishermen to resort to the bottoms which heretofore were neglected as not being rich enough to repay the effort of fishing. Very slowly, after repeated warnings by the Government fishery officers on the ground, restrictive measures have been adopted; but these have come too late. In any case, it is doubtful if they alone would have proved adequate to save the industry from depletion without the aid of oyster culture operations. The decision of the Imperial Privy Council on the Fisheries Reference in 1898 divided in uncertain fashion the proprietary interest in the foreshore, and has effectively prevented that certainty of ownership which is essential to the investment of private capital in oyster farming. No man is going to invest his capital where others may claim the fruit of it.

Yet the future of the industry is not so black as one might conclude from these facts. The matter of divided jurisdiction is one that is possible of adjustment as between the Federal and Provincial authorities. The oyster, under favourable conditions, multiplies rapidly and comes to maturity within a period of some four years. The Canadian oyster area is extremely large, and the experience of the United States, England, France, and other countries shows that oyster culture can be successfully prosecuted with the sure return of a handsome rate of profit. What is required, therefore, is a full knowledge of the present condition of the industry, the causes that have brought about that condition, and the regulations and laws in force, so that a sure basis may be laid for determining what measures are best calculated to encourage the adoption of artificial culture on a large scale by private interests.

The Oyster Producing Area

Nearly all the oysters grown in Canada come from the Atlantic sea-board. British Columbia produces, though so far in relatively small quantities, a native oyster (*ostrea lurida*) which is inferior in size and quality to the eastern oyster. The three provinces, however, that produce practically all our oysters are



OYSTER FLEET IN THE OFFING, RICHMOND BAY, P.E.I.

MAU

Prince Edward Island, New Brunswick and Nova Scotia. Since 1871, when statistics are first available, the island province has produced nearly twice as many oysters as New Brunswick, its closest competitor. Nova Scotia comes third. The Atlantic oyster area may be said to be the half-moon shaped shores of Nova Scotia, Cape Breton and New Brunswick, bordering on the gulf of St. Lawrence, with Prince Edward Island as the "star within the nether tip" of this crescent.

Analysis of Statistics of Production

An examination of the table indicating the production of oysters in all Canada[a] shows that the industry was at its zenith in the eighties and early nineties. The high point was reached in 1882 with a production of 64,646 bbls. During the whole period from 1882 to 1893, the yearly production never fell below 50,000 bbls. save in one year. The second stage in the decline is noted in the years 1894-1901. During these years, the annual yield ranged between 40,000 and 50,000 bbls., except in 1898 when it was 53,656 bbls. The third stage in falling production enters with the year 1902. Never since 1901 has the yield risen above 40,000 bbls. From the beginning of this third stage, there has been a gradual but sure decrease in production, the lowest point in thirty years' history of the oyster fishery in Canada being reached in 1907 when only 27,299 bbls. were harvested. The larger catch of the past two years is due to the more intensive methods of fishing that have been stimulated by high prices, rather than to any actual increase in supply.

So much for the production in Canada as a whole. Let us now examine the production records[b] of each of the oyster-producing provinces and see just where the greatest shrinkage has occurred. Considering the whole time the fishery has been engaged in, Prince Edward Island has given us more oysters than any other province. In 1882 the oyster crop of that province reached its maximum with a yield of 57,042 bbls. The yield of this year, however, was rather abnormal. Yet, during the whole period from 1880 to 1891, the industry was remarkably healthy, the annual production averaging nearly 35,000 bbls. Beginning with 1892, the production began to fall off. In 1891, it was 41,030 bbls.; in 1897, 20,915; in 1906, it shrank to 14,988 bbls.; and in 1907 it reached its minimum point with a yield of only 9,672 bbls. A decrease of over 47,000 bbls. in twenty-five years is the record of Prince Edward Island.

The other provinces do not show up so badly as Prince Edward Island. New Brunswick reached the height of its production in 1885–1890 with an annual average of approximately 21,000 bbls. After that, production declined to 12,470 bbls. in 1903. Since then it has been on the increase. In Nova Scotia, the proportionate decrease has been large; but the small

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a See p. 142
b See table on p. 144

production of the province does not greatly affect the total for Canada. In British Columbia, the industry has never assumed large proportions.

This analysis indicates that it is in Prince Edward Island that oyster fishing has declined most. Yet, in each province there has been a falling off. Of course, if individual years only be selected, a conclusion with regard to the state of the industry which is not true can easily be reached. But if we consider the production over a period of years, the one conclusion is inevitable: the oyster industry is fast nearing a state of absolute depletion.

The Demand

This, too, in the face of a demand that is increasing year by year. Improved railway facilities have extended the margin of the oyster market far inland. Prices, during the past twenty years, have increased by fully 240 per cent[a] and large quantities have had to be imported from the United States. If we lump together oysters imported in all forms,[b] we find that, in 1909–10, Canadians consumed about 389,500 gals., raw and canned, of foreign-grown oysters. And this large quantity was imported in spite of the existence of a duty ranging from 17½ to 25 per cent. on oysters in the shell, and from 1½c to 3c a pint for those shelled or preserved. The total value of oysters imported in 1909–10 was $369,166, and the duty paid on them was $43,669. In other words, we are paying to other countries in excess of $350,000 per year for a product which we ourselves could produce in quantity more than sufficient to supply home consumption if only proper encouragement and safeguards were given to the industry.

Natural History

In order intelligently to understand the question of the depletion of our oyster beds and the measures necessary for the rehabilitation of the industry, some points in the natural history of the mollusc must be called to mind. The oyster is a bivalve. The two valves or halves of the shell are joined together by a hinge which allows the oyster to gape so that water may be inhaled. It is by straining from this water the minute solid portions of marine animal and vegetable life that the oyster obtains the food on which it subsists. It is found upon the sea shores in a depth of a few feet of water and, being a brackish water form, flourishes best where streams of fresh water empty into the ocean. The degree of salinity of the water is an important factor in suc-

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[a] The following price statistics, kindly supplied by A. Wilson & Son, of Halifax, show the rise in wholesale prices since 1890. The prices are those obtaining on or about Nov. 1 each year and are quoted f.o.b., point of shipment from fishing grounds.

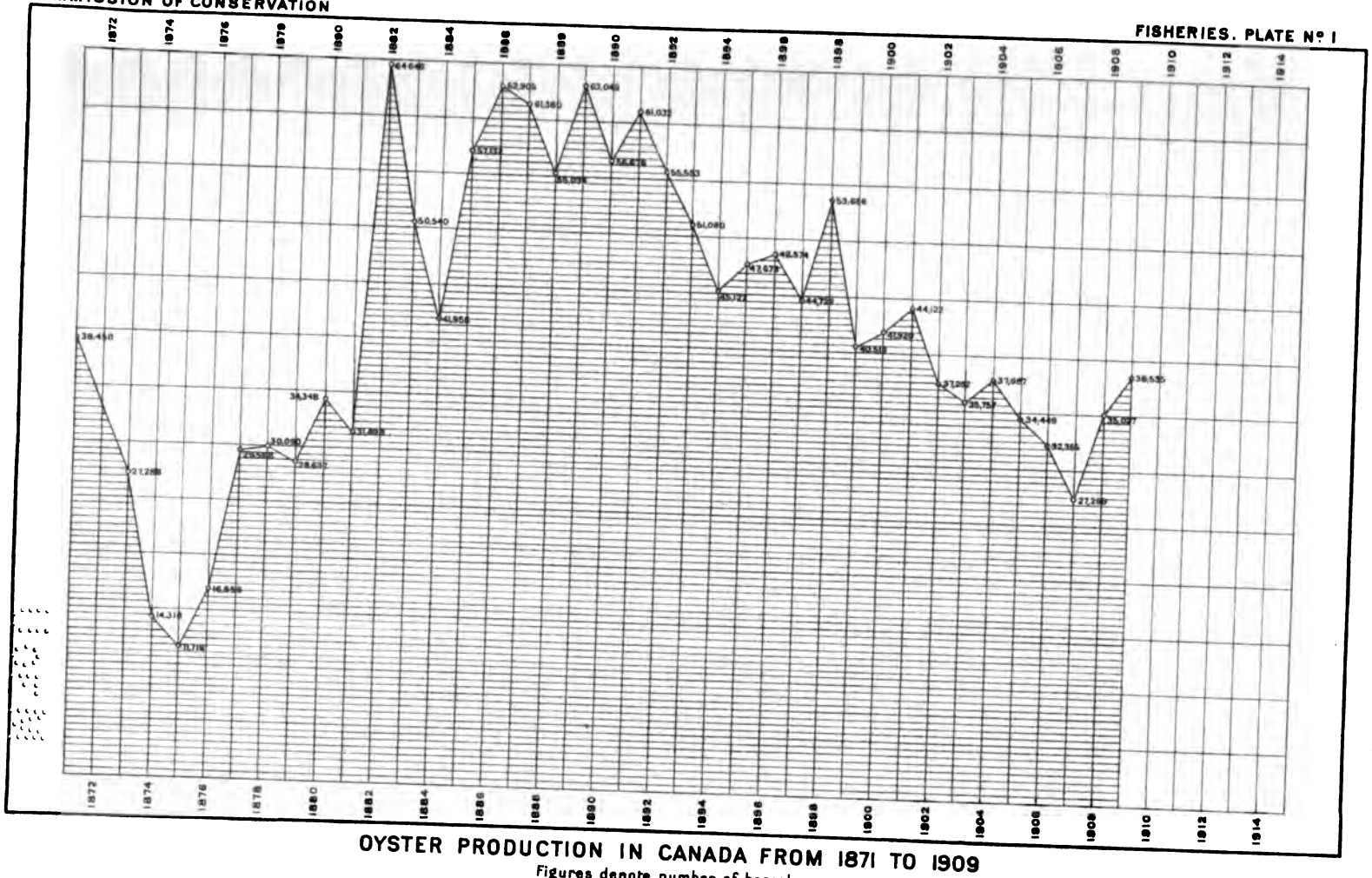
In 1890, the price was $1.90 per bbl.

From 1890 to 1895, the price was from $2.00 to $2.30 per bbl.

From 1896 to 1907, the price rose from $2.30 to $4.50 per bbl.

In 1908 and 1909, prices averaged $6.50 to $7.00 per bbl., the maximum being $10.00

[b] Statistics compiled from Report of Customs Dept. for 1910, pp. 98-100.



OYSTER PRODUCTION IN CANADA FROM 1871 TO 1909

Figures denote number of barrels

cessful oyster farming, as is also the temperature. Reproduction takes place during the late spring and early summer. Some idea of the remarkable fecundity of the oyster may be gathered from the fact that each female produces every season from 50 to 100 million eggs.[a] The fertilized ova are known as spat. This spat swims about for a short period (about two or three weeks) and finally attaches itself to some smooth hard surface to which it adheres for the rest of its days. A requirement of first importance in oyster culture is that there be a suitable substance (commonly called cultch) to which the spat may attach itself. Old oyster shells are generally used for this purpose but the spat will attach itself to any hard clean substance such as tiles, old bottles, iron piping, clay pipes and the like.

Depletion—Its Causes and the Remedies

What, we may well ask, is the cause of the ruin of an industry that other nations have found a source of immense profits? The cause, in general terms, is the blind disregard for the future shown by those engaged in it and by those charged with its protection. One feels a sense of shame at the wanton waste that is revealed in the history of the Canadian oyster industry. In early years, oysters were actually burned in order to obtain the lime contained in the shells. Ice fishing, which was not prohibited by law until the past decade, was another prolific cause of waste. The oysters were raked up from the bottom through a hole in the ice, the large ones sorted out for market and the small ones left on the ice to perish with the cold. As late as 1891, we find inspectors in their reports urging that a law be passed to prevent the wholesale destruction of all the oysters taken that were not large enough for marketing. The practice was to take the catch to the beach and there sort it over, reserving the large oysters for sale and leaving the small ones in great heaps on the shore to rot.

But it is the mud-diggers that take the palm as agents of destruction. When winter comes and the ice forms, great power digging machines can be seen dotting the ice over the oyster beds, The farmers consider that the mud and oyster shells, with their large percentage of lime, are valuable as a fertilizer for the land and every winter these machines cut the oyster beds to pieces and suffocate all the oysters round about by the deposits of mud that settle down. Great destruction has been caused by this means and it is worth noting that the danger from it still exists. These conditions have since been remedied, in part at least, by legislation; but restrictive measures were adopted with such slowness that extensive damage has been done which is irreparable.

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[a] J. L. Kellogg: *Shell-Fish Industries*, p. 24. See also Prof. E. E. Prince's *Peculiarities in the Breeding of Oysters* (1895), p. 13.

Regulations

It is instructive to note just how far legislation has attempted to remedy these evils. In 1890, the only regulation in existence was that there should be a close season from June 1st to September 15th.[a]

Apart from this restriction, any person could rake oysters at any place and in any manner he pleased, wholly regardless of the size of the oysters taken or of injury to the beds. The close season has been lengthened from time to time until now it is from April 1st to September 30th, inclusive, except in British Columbia, where it extends from May 1st to August 31st, inclusive. Ice fishing has been prohibited, as has also been night and Sunday fishing. A size limit has been established, and at the present time no person is allowed to take or have in his possession, round oysters of a less diameter than three inches, or long oysters of a less diameter than three and a half inches of outer shell. Mud digging is prohibited within 200 yards of any live oyster bed, and then may be prosecuted only at such places as may be prescribed by a fisheries officer. A fee of 50c. is levied on each boat with one fisherman, and 50c. additional is charged for each extra man fishing from the same boat. In British Columbia, a charge of $2.50 is imposed on persons wishing to fish for oysters on natural beds, and a rental fee of $2.00 per acre per annum covered by such license, is levied.

Dispute over Jurisdiction

These regulations, on the whole, are not unsatisfactory. The essential fact to grasp, however, is that the industry cannot be regenerated by restrictive measures alone. What is needed is the institution of private oyster culture on a large scale. But that cannot be thought of till the present dispute as to the rights of the Dominion and Provincial Governments to issue leases for fishing is definitely settled, once and for all.[b] The exploitation of oyster beds, it is true, has yielded enormous profits to capital wherever it has been persistently and scientifically engaged in; but even these large returns will not attract men of means to invest if the title to the oyster areas be clouded.

The matter has been rocking in the judicial balance since 1898, and at the present time the question, in its relation to British Columbia, is

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[a] Fisheries Report, 1898, p. 295.

[b] Representatives of the three Maritime Provinces who met at Moncton, N.B., on May 6 and 7, 1910, to consider the oyster industry came to the following conclusions regarding this phase of the subject:

"That we believe that the culture of oysters by private individuals on areas leased for that purpose will undoubtedly result in a much improved condition of and a larger production from the public beds, and we strongly recommend that every encouragement and the fullest protection should be accorded to those engaged in such culture.

"That the present apparent conflict of jurisdiction between the Dominion and Provincial authorities should be so arranged that those engaging in the private cultivation of oysters will have security in the titles to leases and be afforded adequate protection for the investment of capital, and to this end we recommend that a conference be held at an early date between the Dominion Government and representatives of the Governments of the Maritime Provinces concerned."

OYSTER FISHERMAN WITH TONGS

before the Supreme Court for adjudication. It centres about the interpretation of section 91 of the British North America Act. This section of the Act says that the Dominion Parliament has exclusive legislative authority in all matters respecting "Sea Coast and Inland Fisheries." Section 92 of the Act, however, gives the provinces exclusive power to issue licenses to provide funds for provincial revenue. It would appear from this that the fisheries, and the oyster industry along with them, may be subjected to double taxation at the hands of the Dominion and Provincial Governments.

The following questions relating to fisheries were submitted to the Judicial Committe of the Imperial Privy Council in the Fisheries Reference of 1898:[a]

> "(5) Had the riparian proprietors before confederation an exclusive right of fishing in non-navigable lakes, rivers, streams, and waters, the beds of which had been granted to them by the Crown?
>
> "(6.) Has the Dominion Parliament jurisdiction to authorize the giving by lease, licence, or otherwise, to lessees, licensees or other grantees, the right of fishing in such waters as mentioned in the last question, or any and which of them?
>
> "(7.) Has the Dominion Parliament exclusive jurisdiction to authorize the giving by lease, license or otherwise to lessees, licensees or other grantees, the right of fishing in such waters as mentioned in the last question, or any, and which of them?
>
> "(8.) Has the Dominion Parliament such jurisdiction as regards navigable or non-navigable waters, the beds and banks of which are assigned to the provinces respectively under the British North America Act, if any such are so assigned?
>
> "(9.) If the Dominion Parliament has such jurisdiction as mentioned in the preceding questions, has a Provincial Legislature jurisdiction for the purpose of provincial revenue, or otherwise, to require the Dominion lessee, licensee or other grantee to take out a provincial license also?"

The substance of the decision is contained in the following quotations from the award handed down:[b]

> "Their Lordships are of opinion that the 91st section of the British North America Act did not convey to the Dominion of Canada any proprietary rights in relation to fisheries. Their Lordships have already noticed the distinction which must be borne in mind between rights of property and legislative jurisdiction. It was the latter only which was conferred under the heading 'Sea Coast and Inland Fisheries' in s. 91. Whatever proprietary rights in relation to fisheries

[a] Appeal Cases, 1898, p. 702 *et seq.*
[b] Ibid, p. 712, *et seq.*

were previously vested in private individuals or in the provinces respectively remained untouched by that enactment. Whatever grants might previously have been lawfully made by the provinces in virtue of their proprietary rights could lawfully be made after that enactment came into force. At the same time it must be remembered that the power to legislate in relation to fisheries does necessarily to a certain extent enable the Legislature so empowered to affect proprietary rights. . . . . The suggestion that the power might be abused so as to amount to a practical confiscation of property does not warrant the imposition by the Courts of any limit upon the absolute power of legislation conferred. The supreme legislative power in relation to any subject-matter is always capable of abuse, but it is not to be assumed that it will be improperly used; if it is, the only remedy is an appeal to those by whom the Legislature is elected. If, however, the Legislature purports to confer upon others proprietary rights where it possesses none itself, that, in their Lordships' opinion, is not an exercise of the legislative jurisdiction conferred by s. 91. . . . . .

"In addition, however, to the legislative power conferred by the 12th item of s. 91, the 4th item of that section confers upon the Parliament of Canada the power of raising money by any mode or system of taxation. Their Lordships think it is impossible to exclude, as not within this power, the provision imposing a tax by way of license as a condition of the right to fish.

"It is true that, by virtue of s. 92, the Provincial Legislature may impose the obligation to obtain a license in order to raise a revenue for provincial purposes; but this cannot, in their Lordships' opinion, derogate from the taxing power of the Dominion Parliament to which they have already called attention.

"Their Lordships are quite sensible of the possible inconveniences to which attention was called in the course of the arguments, which might arise from the exercise of the right of imposing taxation in respect of the same subject-matter and within the same area by different authorities. They have no doubt, however, that these would be obviated in practice by the good sense of the legislatures concerned."

Briefly expressed, the gist of the judgment is that the British North America Act did not convey to the Dominion any proprietary rights in fisheries, although it did convey the right of legislative jurisdiction. This latter, it was admitted, enables the Federal Government to affect the proprietary rights of the provinces to almost any extent, short of transferring them to others. Thus, whatever proprietary rights in relation to fisheries were previously vested in private individuals or in the provinces were not affected by the British North America Act. The enactment of fishing regulations and restrictions was held to be within the exclusive competence of the Dominion. It was further decided that the Dominion had power to levy a tax or license as a condition of the right to fish, and that the Provincial Parliaments, by virtue of section 92, had the same power.

This decision leaves the oyster fisherman in a most anomalous position. First, the province has the proprietary right to practically all the foreshore where he wishes to plant his oysters. Yet the Dominion Government, having exclusive legislative jurisdiction, can impose all sorts of restrictive measures as to close seasons, size limits, gear used, and the like, up to the point of rendering the fishing privilege worthless. Second, he cannot take oysters off the beds without paying for a license from the Dominion authorities. But, at the same time, he may be subjected to an additional tax levied by the Provincial Government. Up to the present, the provinces have not availed themselves of this taxing power. Nevertheless, it is within their right, and acts as a threatening possibility to prevent private oyster culture. It is significant that the province of Nova Scotia is now considering action to impose a provincial tax.[a] Is it any wonder, then, with all this confusion and uncertainty, that every effort to interest private capital in the development of this industry has been futile?

The important question, however, is, "How is the difficulty to be solved?" A test case in which British Columbia is the principal, is now before the Supreme Court of Canada, and it is within the range of possibility that the dispute may be settled soon in a manner satisfactory to both parties. On the other hand, the law is exceedingly prone to delay, and every year settlement is delayed the oyster industry is in a worse condition. If the Provincial and Dominion authorities met together in friendly conference, with a fixed idea that the case must be settled at once, it is altogether likely that an agreement could be reached immediately that would be much more acceptable than any decision by the Courts. Three points are now fairly well settled. It has been decided that the provinces have a proprietary right in all oyster lands held by them previous to Confederation. It is conceded that the Dominion has power to impose restrictive measures on the fishing of these beds, which, if exercised to the full, would practically render them useless for oyster producing purposes. The third settled point is that the provinces, as well as the Dominion, have the right of taxing the oyster fishermen. Would it not be the reasonable and the expedient course for an understanding to be reached whereby the exclusive power to lease oyster bottoms should be handed over to the Federal authorities in return for giving to the provinces a certain percentage of the revenue to be agreed upon? Federal jurisdiction should be given the preference over provincial, because then there would be no working at cross purposes as between provinces, to the detriment of the industry. In addition, the Dominion now has all the organization required to take over the administration of such a scheme. This conciliatory course would undoubtedly contribute

[a] Letter of Hon. A. K. Maclean, Attorney General of Nova Scotia, Oct. 18, 1910.

much further towards a permanent solution of the question than would any arbitrament of law.

Free Fishing

So much for the legal side of the matter. That must first be dealt with because it presents the primary difficulty to the establishment of private oyster farms. As soon as the jurisdiction is definitely determined, the supreme administrative authority can direct its attention to the removal of the existing evils preying upon the oyster industry. One of the chief of these is free fishing. During the open season anyone, upon payment of a nominal boat license of 50c., can take oysters off any part of the Atlantic oyster area, with the exception of some 3,382 acres reserved for artificial propagation of oysters by the Dominion Government. Formerly, when any restriction on free fishing was proposed, there was a great deal of opposition aroused in the oyster producing provinces. One of the arguments usually advanced was that it would come hard on the poor, who looked forward to making enough money in the oyster season to tide them through the winter. The harvest of the sea was considered as everyone's right. The policy pursued was that of every man for himself. When oysters were plentiful, this unrestricted fishing privilege, of course, militated against oyster culture by individuals. But now conditions are changed. Oysters are growing less plentiful year by year, and people conversant with the true situation are less likely to oppose fair restrictive measures for the preservation of the supply. They realize that resort must be had to measures that are somewhat heroic. Other countries, when their oyster beds were nearing depletion, have found it advisable to prohibit fishing for three or four years on a certain fraction of their unleased oyster area, say, one-third or one-quarter; and when one reserved portion is thrown open to fishing, the same area in another part is set aside. At the end of the nine or sixteen years, this expedient has been found to have resulted in a much improved condition of the beds. The present low state of the industry in Canada makes this plan one that could be temporarily adopted without serious opposition.

Leasing System

An equitable system of leasing or licensing oyster areas can be evolved once the jurisdictional dispute is settled. The present Fisheries Act[a] authorizes the issuing of leases or licenses to persons wishing to plant oyster beds, and gives such persons the exclusive right to the oysters found thereon. A maximum area to be leased to one individual should be fixed and monopoly thereby prevented. Although these licenses may be issued for any length of time, the practice has been to limit them to nine years, renewal being optional with the Minister of

[a] R. S. C., Chap. 45, s. 67.

READY FOR THE OYSTER BEDS

Marine and Fisheries. The areas set aside by the Government for the natural and artificial propagation of oysters are as follows:

Portion of York river, P.E.I.[a]	200 acres*
Portion of Big Tracadie harbour. N.S.	1,985 acres*
Portion of Shediac harbour, N.B.	1,197 acres*

Until the Imperial Privy Council decision of 1898 put the quietus on leasing, considerable areas had been let. At the present time, only a very small area[b] is held under license, distributed as follows:

Prince Edward Island	4 acres
New Brunswick	19 acres
British Columbia	138 acres

The nominal fee of $1 an acre is charged for licenses. The regulations set no limit to the term for which licenses may be granted but the practice has been to grant them for a period of nine years, subject to renewal at the Minister's option. In British Columbia, a charge of $2.50 is imposed on persons wishing to fish for oysters on natural beds, and a rental fee of $2 per acre per annum covered by such license, is levied.

It is needless to recount the advantages that would ensue from the leasing of oyster bottoms to individuals, once jurisdiction is settled. In all other countries, the adoption of private property in oyster lands, as in the case of agricultural lands, has marked the beginning of real progress in the industry. It may be suggested that the present regulations should be amended by fixing a definite maximum area that one person or corporation is allowed to hold or control. For the better encouragement of private enterprise, the term of the lease or license could well be lengthened to eleven or twelve years, and renewal should be made contingent upon fufilment of conditions of the lease, not upon the Minister's option. It would be inadvisable, at least for the first six years of the lease, to increase the annual rental charge of $1 an acre.

Government Oyster Culture

If the full benefit is to be derived from a system of leasing oyster areas to private persons, some means must be taken by the government to supply spawners and seed oysters at cost price. This would not have been necessary if private culture had been possible before the natural beds had been reduced to their present condition. As the situation is at present, some difficulty would be experienced by oyster farmers in getting sufficient seed oysters and spawners to plant their beds. The government conducts no operations of this kind now. All its efforts have been purely demonstrational. It has shown by

[a] Not now considered as an oyster reserve as it has filled up with mussels.—Letter of Hon. F. L. Hassard, Nov. 10, 1910.

* Computed approximately.

[b] Communication from Dept. of Marine and Fisheries, Oct. 17, 1910.

raising oysters on bottoms not naturally stocked, that oyster culture can be successfully prosecuted under such conditions. This is not enough, and when oyster farmers can get a satisfactory title to oyster areas, they should be further encouraged by the assurance of a supply of seed oysters and spawners for stocking their holdings.

Scientific Investigations

A complete survey of the oyster producing area to chart and classify the natural reefs is essential. The extent of this area is not now known, the Fisheries officials characterizing it as "Practically unlimited." The Marine Biological Stations should be re-organized and their duties enlarged to take in this work. They should also undertake exhaustive scientific observations to determine to what extent different areas are suited for growing oysters. The public should have the benefit of investigations showing the salinity, temperatures and nutritive value of the water in the area supposed to be suitable for oyster culture. Ignorance of fundamental natural conditions often leads to large losses of capital invested in oyster farming and tends to discredit the industry.

Mud Digging

The evil of the mussel mud digger has already been adverted to. The regulations now permit the digging to be done not nearer than 200 yards from a live oyster bed and then only when a fishery inspector's permit is given. It would be a proper subject of investigation whether or not these regulations were being properly enforced.[a]

The evil has been particularly evident in Prince Edward Island and it is extremely doubtful, in the case of the sandy loam of that Province, whether the fertilizer of mud and decomposing oyster shells has all the virtues ascribed to it by the farmers. The caustic action of the lime destroys the rich vegetable humus, an especially necessary constituent in light soils. Dr. Cyril G. Hopkins, one of the most eminent authorities on agriculture in the United States, says:

> "This use of lime on a soil which is already deficient in nitrogen or other plant food, only serves to still further exhaust the soil of its meagre supply of these elements. Without a doubt, this is the most common condition and the most common effect of the continued use of caustic lime. It is true that the immediate effect is usually

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[a] At a conference of representatives of Nova Scotia, New Brunswick and Prince Edward Island at Moncton, N. B., on May 6 and 7, 1910, to consider the oyster industry, a resolution was passed with respect to the enforcement of the oyster regulations which states

"That a stricter supervision on the part of the Fishery Wardens is required in order that the regulations of the Department should be faithfully observed; that to this end officials for the general enforcement of the Fishery Regulations should be appointed who are not interested either as fishermen or dealers, and who will devote their whole time to the duties assigned them; and that in the interest of the industry a proper system of selection and inspection should be inaugurated."

MUD DIGGING MACHINE AT WORK ON THE OYSTER BEDS, BEDEQUE BAY, P.E.I.

somewhat increased crops, but it should be borne in mind that when a farmer pays out money for lime to be used for this purpose, he is purchasing a stimulant which will ultimately leave his land in worse condition than before, especially in the loss of nitrogen and organic matter."[a]

Experience of Other Countries

The experience of other countries coincides with that of Canada in that oyster beds that were thought inexhaustible became badly depleted by unrestricted fishing. In every case, however, where government interfered with wise regulations and made use of the services of scientific men the industry has been revived. The solution has invariably been found in private oyster culture.

France

The experience of France is instructive. In the early years of the nineteenth century, the natural beds were believed to be inexhaustible. The supply of oysters had increased to an amazing extent during the suspension of fishing caused by the Napoleonic wars. When peace was concluded, the beds were the resort of a largely increased number of fishermen. The supply began to fall off rapidly about the middle of the century and the government sought remedial measures. Owing to the strenuous and patient efforts of Le Bon and Coste, artificial propagation was proved successful beyond a doubt; not, however, before costly set-backs had been experienced because the habits of the oyster and the environment necessary for its growth had not been sufficiently studied at the beginning. Oyster grounds that were formerly public property were leased to individuals, protection was afforded against poachers and the industry was placed on a permanent and paying basis. To-day oyster farming is ranked among the most profitable industries of France.

England

The English oyster industry is not as extensive as that of France. However, the same story of depletion from unrestricted fishing is true of England as it is of France. Until 1866, when the old laws enforcing a close season were repealed, it is stated there were about 700 men, working 300 boats, employed at Falmouth. In 1876, only 40 men and 40 boats could find employment, and a boat could get only from 60 to 100 oysters a day where formerly from 10,000 to 12,000 could be taken.[b] Before the English Commission for the Investigation of Oyster Fisheries, 1876, it was testified that one man fishing in Emsworth harbour between 1840 and 1850 could take from 24,000 to 32,000 oysters in five hours. In 1868, on account of over-fishing, a dredger, in the same time, could not secure more than twenty.

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[a] Hopkins: *Soil Fertility and Permanent Agriculture*, p. 164.

[b] W. K. Brooks: *The Oyster*, p. 73.

Since that time capital has been largely invested in oyster farming and strong companies have obtained control of large areas of oyster bottoms. Scientific methods have been adopted, and the industry is now on a permanent and paying basis.

Japan

In Japan, too, grounds for oyster growing are rented to private individuals. Oyster culture has been practised since ancient times and has been found very profitable. It is easily carried on there because the coastal waters are not muddy, bamboo is a cheap collector of spat and there are few natural enemies in those waters.

Rhode Island

The administration of the oyster beds of this State was placed under a Shell Fish Commission as early as 1864. The natural oyster beds are left open to free fishing and only those areas which can be utilized by cultch planting and the planting of seed oysters and spawners, are leased to private individuals and corporations. The leasing charge ranges from $5 to $10 per acre, the term of the lease being not less than five nor more than ten years. In 1900, the receipts were only $20,973.08, In 1909, the leased lands covered an area of 16,814.7 acres and brought in a revenue of $104,576.49. The case of Rhode Island demonstrates what a profitable source of revenue to the State even the potential and unimproved oyster bottoms can be made.

Connecticut

The Shell Fish Commissioners in Connecticut are authorized to tax oyster lands at one and a half per cent. of their valuation. Oyster bottoms are leased to private interests. For a 5-ton boat a license fee of $5 is charged and for larger craft, a fee of $1.50 per additional ton. In 1909–10, the total revenue from the oyster industry was $27,265.48.

Maryland

The oyster areas of Maryland are administered under the Haman Law of 1906. It provides that only the barren bottoms shall be leased for culture purposes to residents of the State, the natural beds being reserved for public fishing. The term of the lease for barren bottoms is twenty years, and the rental fee increases from $1 per acre for the first year to $5 per acre for the sixth and succeeding years. The area that one person may hold under lease varies from 1 to 10 acres within the territorial limits of any county, and from 5 to 100 acres beyond the county limits. The Shell Fish Commission, which administers the industry, has recommended that the maximum area of bottoms which may be leased to one person be increased to 30 acres in the first instance and to 500 in the second. It has also suggested that the rental charge be reduced to $1 per acre.

Louisiana

The State of Louisiana enjoys oyster laws of the most progressive kind and these, together with the favourable natural conditions, have combined to make private planting remarkably successful. The first feature to note is that at least seventy per cent. of the natural oyster reefs of the State are to be reserved from leasage forever and are open to public fishing. As to the residue, no person or corporation may lease or control more than 1,000 acres. Each lessee may be apportioned natural reefs to the extent of not more than twenty per cent. of the total area of reefs granted him, the remaining eighty per cent consisting of depleted reefs. In any case, no one may lease more than 150 acres of natural reefs. The rental charge is $1 per acre for depleted reefs and $5 per acre for natural reefs. In addition, there is a tax of 3c. per barrel on all oysters marketed and a boat license fee of 50c. per ton. The term of the lease is for fifteen years and is renewable for a further term of ten years, thus giving an assured tenure of sufficient duration to prove attractive to oyster culturists.

The oyster law forming the basis of the present legislation was introduced in 1902. The effect has been astounding. In the five years preceding the enactment the increase in production, which was mainly from the natural beds, was twenty per cent., while in the first five years following the passage of the Act, and after it had been approved and amended, the increase was a hundred and fifty-four per cent. In 1902, the catch was 1,198,413 bushels; in 1905, it was 2,187,000; while, in 1908, it reached the high total of approximately 3,600,000.

The case for oyster culture is, indeed, a strong one. Wherever it has been given a fair trial, in England, Holland, France, Japan or America, it has proved its worth. Statistics are not lacking to demonstrate how valuable an industry it may be made. The United States is a case in point. In that country, the value of the annual oyster supply is $18,000,000 and of this amount $10,000,000 worth comes from planted beds. Canada has splendid natural conditions for the production of oysters by artificial propagation, and it is high time that steps were taken to enable oyster farmers to begin operations.

Profits

The fact that oyster planting has been extended to wider and wider areas in those countries where it is permitted, is proof enough that it is a paying proposition. The main cause of disappointment and loss is ignorance of the biology of the oyster and of the environment necessary for its growth. If, as suggested, the work of the Marine Biological Stations were enlarged to make clear these points, prospective oyster culturists in Canada could not complain on this score. The capital required for oyster culture is exceedingly small and as the mollusc is fit for market in about four years, the investment does not remain long without paying dividends. It is instructive to note that in

the recent flotation of the stock of a large consolidation of oyster companies in the United States the promoters advertise that one of the constituent companies has paid average annual dividends of about sixty per cent. since 1904, and another, of about two hundred per cent.[a]

In conclusion, it may again be said that the rehabilitation of the oyster industry in Canada depends on the immediate establishment of oyster culture by private persons. That is the great desideratum to the accomplishment of which all efforts should be directed. The supreme hindrance to its adoption is the conflict of jurisdiction between the Dominion and the Provinces. That can be settled if every effort is concentrated upon it. When once an understanding has been reached regarding it, the remaining subordinate problems can be solved easily and quickly. The paramount consideration is that action must be taken NOW. If Province and Dominion will only throw *laissez-faire* to the winds, there is not the slightest doubt but that Canada's oyster industry would speedily come to its own, and munificently reward all the honest toil bestowed upon it.

OYSTER PRODUCTION IN CANADA[b]

Year	Barrels
1871	39,450
1872	no record
1873	27,288
1874	14,318
1875	11,716
1876	16,856
1877	29,568
1878	30,090
1879	28,632
1880	34,348

[a] See *World's Work*, October, 1910, advertising section.

[b] Figures for 1871-1875 are taken from Statistics by J. Hunter Duval, given in Fisheries Rept., 1898, p. 283.

Figures for 1876-1897 are taken from Statistics by Prof. E. E. Prince in Fisheries Rept., 1898, p. 353.

The remaining figures are from the Annual Fisheries Reports, except the British Columbia figures, 1897-1908, which were supplied direct from the Fisheries Department.

OYSTER PRODUCTION IN CANADA—*continued*

Year	Barrels
1881	31,498
1882	64,646
1883	50,540
1884	41,956
1885	57,132
1886	62,905
1887	61,360
1888	55,034
1889	63,049
1890	56,676
1891	61,032
1892	55,553
1893	51,080
1894	45,127
1895	47,673
1896	48,574
1897	44,722
1898	53,656
1899	40,513
1900	41,920
1901	44,122
1902	37,292
1903	35,757
1904	37,987
1905	34,449
1906	32,355
1907	27,299
1908	35,027
1909	38,535

OYSTER PRODUCTION BY PROVINCES
(Barrels)

Year	P. E. I.	Nova Scotia	New Brunswick	British Columbia	Year
1876	7,905	1,040	7,911	.....	1876
1877	20,850	980	7,738	.....	1877
1878	17,902	912	11,270	.....	1878
1879	18,145	1,067	9,420	.....	1879
1880	20,297	1,861	12,280	.....	1880
1881	20,815	2,270	8,413	.....	1881
1882	57,042	1,745	5,859	.....	1882
1883	38,880	1,343	10,317	.....	1883
1884	28,290	1,595	11,851	220	1884
1885	28,204	1,310	27,368	250	1885
1886	33,125	1,397	28,083	300	1886
1887	36,448	1,716	23,196	.....	1887
1888	35,861	1,589	16,384	1,200	1888
1889	41,257	2,532	17,760	1,500	1889
1890	35,203	3,013	16,710	1,750	1890
1891	41,030	4,318	14,934	750	1891
1892	32,937	3,776	17,840	1,000	1892
1893	29,627	3,488	16,365	1,600	1893
1894	24,055	2,512	16,960	1,600	1894
1895	25,463	2,540	18,070	1,600	1895
1896	30,214	2,460	14,700	1,200	1896
1897	20,915	2,372	19,835	1,600	1897
1898	26,484	2,097	22,675	2,400	1898
1899	18,236	2,027	17,250	2,400	1899
1900	17,825	1,855	19,240	2,400	1900
1901	24,972	1,690	14,460	3,906	1901
1902	20,334	1,663	12,795	3,906	1902

OYSTER PRODUCTION BY PROVINCES—*continued*

(Barrels)

Year	P. E. I.	Nova Scotia	New Brunswick	British Columbia	Year
1903	18,333	1,354	12,470	4,390	1903
1904	18,006	1,411	15,320	3,125	1904
1905	17,656	1,466	14,300	1,605	1905
1906	14,988	1,722	14,920	1,132	1906
1907	9,672	1,337	15,435	1,336	1907
1908	11,472	1,515	19,080	2,960	1908
1909	13,519	1,716	19,340	3,960	1909

WHITEFISH IN THE GREAT LAKES

By C. W. Gauthier

It was considered desirable to obtain the views of an experienced operator on this subject, and Mr. Gauthier kindly consented to contribute the following article. His views are submitted for consideration.—Editor.

In considering the question of the supply of whitefish in the Great lakes the recommendations made by Frank N. Clark, of the United States Fish Commission, at the International Fisheries Convention held at Washington in September, 1908, are worthy of attention. Mr. Clark, who is an expert fish culturist, recommended that from two to five billion whitefish fry be propagated yearly on each side of the Great lakes, and stated that, if this were done, the fish would soon become as abundant as in former years. He also recommended that the present hatcheries be enlarged and new ones having large capacity be built, so that a close season would be practically unnecessary. The artificial propagation and introduction of whitefish into lake Erie and the Detroit river, he said, had increased the catch in recent years. He believed that, if a close season must be enforced, it should be changed from November to July and August, when the water is warm and the fish, consequently, are in poor condition for the market. Hon. Seymour Bowers, of the Michigan Fisheries Commission, Prof. James Nevin, of the Wisconsin Fish Commission, Prof. Downing, of the United States Fish Commission, and the majority of those present agreed with the views above quoted.

The principal causes for the depletion of whitefish in the Great lakes are (1) The use of large numbers of gill nets set upon the feeding grounds in deep waters, where they catch only the whitefish and trout; (2) the soft fish which frequent the shallow water are not caught in these deep water nets; consequently when the whitefish come into the shallow waters to spawn, these soft fish, such as herring, mullets, pike, perch and pickerel, prey upon the eggs and upon the young whitefish.

The remedy for this depletion is the building of new hatcheries and the enlargement of present hatcheries to make it possible to increase the output to two billions of whitefish fry yearly, for the Great lakes. The use of pound nets should be encouraged because these nets can be set only in shoal waters and will catch large quantities of the aforementioned soft fish and pickerel, which prey upon the whitefish and their eggs. The taking ashore of all fish caught in the pound nets, except immature white-

fish, should be made compulsory. The propagation of salmon trout should be discontinued as they are of less commercial value than whitefish and cost ten times more per million to propagate. When trout are mature, they devour the whitefish, both grown and immature.

The Lake Erie and Detroit River whitefish are the finest quality in North America, being the whitest in color and the finest in flavour. For this reason, as much spawn as possible should be collected each year from the fisheries in lake Erie and Detroit river for propagation in the hatcheries to replenish the Great lakes. With proper arrangement several hundred millions of whitefish eggs could be obtained each year. In former years, money has been spent in procuring eggs of inferior quality from the bay of Quinte. These eggs were sent to Sandwich hatchery for propagation, when sufficient eggs of good quality could have been obtained from the Detroit river to have completely filled the Sandwich and Sarnia hatcheries and for less money per million than was spent in obtaining eggs from the bay of Quinte. The amount obtained from the bay of Quinte was so small that the Sarnia hatchery was closed during 1909, and the Sandwich hatchery had to operate at only partial capacity. In three years, 1901, 1902 and 1907, ninety million eggs were sent from the Detroit River fisheries to the Selkirk, Manitoba hatchery, where the whitefish are worth to the fisherman only 3c. per lb., while, according to the reports of the Department of Marine and Fisheries, they are worth 10c. here. This will show the necessity for the enlargement of our present hatcheries and the establishment of new ones, as the 90,000,000 eggs sent out of the Province were badly needed in Georgian bay. In the years 1897, 1901, 1906 and 1908, eggs were not supplied to the Selkirk hatchery, nor were they supplied to the Berens River hatchery in 1908. So few eggs were provided for the Selkirk hatchery that only 289,000,000 fry was the total output for sixteen years, while the capacity for that time was 1,440,000,000 eggs.

The whitefish of the Great lakes is the most valuable commercial fish in Canada. Those weighing 4½ lbs. and upward are sold as high as $25 to $30 per 100 lbs. and are used as planked whitefish. The Department should obtain eggs from the large variety and propagate them for market in large cities. The Department should have the advice of a practical experienced fisherman; one who is thoroughly versed in the various kinds of fish, their habits, the localities which they frequent, the kinds of nets used in the Great lakes and rivers, and the propagation and preservation of the most valued kinds of fresh-water fish. The first consider ation should be the building of hatcheries and the enlargement of old hatcheries, and the systematic gathering of spawn, yearly. The Department has never placed whitefish fry in lake Superior, Georgian bay, or the Manitoulin Island district, and has planted in the southern portion of lake Huron during the past ten years the fry from only 3,000 fish. For the

upper lakes, hatcheries should be established at Port Arthur, Sault Ste. Marie, Collingwood, Owen Sound and Southampton. The hatchery at Wiarton should propagate whitefish eggs only. In the past, this hatchery has propagated salmon trout, the most voracious of fish, which devours both young and mature whitefish.

For lakes Erie and Ontario, hatcheries should be established at Kingsville, and at one or two other places such as Hamilton, Port Hope, Kingston or Belleville.

The writer could this year provide 2,000,000,000 or upwards of whitefish eggs at less than one-half the cost per million, on the average, than has been expended during the past eight years to provide an insufficient quantity for the Sandwich and Sarnia hatcheries.

During the past four years, about 80,000 whitefish have been caught in the bay of Quinte. The rocky and gravel beaches have so injured these fish that only about 185,000,000 eggs were procured instead of the 900,000-000 which that number of fish should have yielded. These eggs, taken from fish of the inferior dark-scale variety, were brought at unnecessary expense to the Sandwich hatchery. This surely shows mismanagement, when large quantities of superior quality were obtainable from the Detroit river, at the very doors of the Sandwich hatchery, especially as eggs from an inferior quality fish such as those of lake Ontario should not be planted among the finest quality whitefish in Canada, where they will increase in numbers to the detriment of the superior species. During the same four years, the Department planted in lake Ontario the progeny of less than eight hundred whitefish.

The increased catch of whitefish in recent years in lake Erie and the Detroit river is proof of the benefit of hatcheries, there being no doubt that the increase is the result of the deposit of fry from the Sandwich hatchery. Some lakes show depletion on account of no deposit of fry, while in others the deposit has been so inadequate as to be of little benefit. The amount of fish caught by Americans in lake Erie has been much greater than the amount caught by Canadians. This is partly due to there being fewer restrictions placed on the Americans, and partly to the fact that Americans have propagated and deposited more fry in their fishing grounds.

In order to understand present conditions and the means for remedying the depletion, I beg to give the following figures taken from the Annual Reports of the Department of Marine and Fisheries. A comparison of the catch of whitefish shows an increased catch out of lake Winnipeg in 1909. The value of the whitefish to the Winnipeg fishermen is only 3c per lb. All the whitefish that come from lake Winnipeg and lake Winnipegosis are caught in a lake area of about 4,000 square miles, as compared with 36,000

square miles of Canadian waters in lakes Superior, Huron, Erie, Ontario and Georgian bay. The Manitoba Fisheries Commission, in its recent report, recommended the enlarging of the old and the building of additional hatcheries in Manitoba. The capacity of the three hatcheries now in operation in that province is 300,000,000 whitefish eggs. If the recommendations of the Commission are carried out, it will probably result in one billion eggs being propagated yearly for the waters of Manitoba. In recent years, as few as twenty-five, thirty, forty and less than fifty million whitefish fry have been propagated yearly. This year about seventy-five million have been propagated in the 36,000 square miles of water constituting the Great lakes of Ontario. Seventy-five per cent. of the fry were liberated into lake Erie and Detroit river, which waters in recent years show a steady increase in catch.

The following statement shows the catch of whitefish in lake Winnipeg and tributary waters:

1896	2,871,539 pounds
1899	2,547,041 "
1900	1,974,020 "
1909	3,468,100 "

Contrast the above with the great decrease in the five Great lakes of Ontario.

1890	7,595,692 pounds
1894	4,598,972 "
1899	2,926,035 "
1905	2,895,170 "
1906	3,545,100 "
1908	4,076,643 "

The increased catch of whitefish in the last two years is partly accounted for by the larger catch in lake Erie, which rose from 204,322 lbs. in 1890, to 826,189 lbs. in 1908. The Department of Marine and Fisheries values the whitefish caught in the five Great lakes at 10c. per lb. and the total catch, of all kinds of fish out of said lakes decreased from 33,328,433 lbs. in 1892 to only 22,572, 300 lbs. in 1905. Of this decrease about one-half was in the catch of whitefish.

The need of propagation and liberation of fry in the waters of certain localities where the greatest depletion has occurred will be apparent from a comparison of the catch for the several years, out of the various lakes.

On the American side of the lakes, the fishermen do not pay license fees, and there is no limitation to the number of nets used. They propagate a much larger quantity of whitefish fry with the result that they

catch more fish. In 1899, the average catch per man on the American side of lake Erie was 7,000 lbs. more than the catch of the Canadian fisherman out of the same lake.

Following is a comparison of amounts taken on the American and Canadian sides of the Great Lake Fisheries:

American Side		Canadian Side	
1880	68,742,300 lbs.		11,473,000 lbs.
1885	99,842,000 "		27,298,000 "
1889	117,085,568 "		32,169,032 "
1899	113,178,750 "		28,677,691 "
Total, 4 years	398,848,118 "		99,617,723 "

The last U. S. Census report for catch of fish in the Great lakes and lake Erie is not available at the time of writing.

1892	33,328,433 lbs.
1902	26,912,665 "
1908	27,614,295 "
1909	28,670,361 "
Total for 8 years by Canadians out of the five Great lakes	216,143,477 "

The following shows the decrease in Canadian whitefish catches in various waters:

Lake Superior

1890	978,400 lbs.
1894	991,333 "
1907	300,640 "
Decrease from 1890 to 1907	677,760 "

Georgian Bay and Lake Huron

1890	5,940,800 lbs.
1894	2,697,036 "
1905	1,073,030 "
1907	1,162,660 "
Decrease from 1890 to 1907	4,778,140 "

Georgian Bay

1890	2,966,000	lbs.
1900	818,420	"
1907	293,240	"
Decrease from 1890 to 1907	2,672,760	"

North Channel, Lake Huron

1890	2,532,800	lbs.
1907	293,240	"
Decrease from 1890 to 1907	2,239,560	"

Lake Huron Proper

1890	442,000	lbs.
1907	81,820	"
Decrease from 1890 to 1907	360,180	"

The Sandwich hatchery established in 1876 has, during a period of thirty-five years, liberated only about 1,400,000,000 whitefish fry, most of which have been for Detroit river and lake Erie. A much larger quantity should have been propagated for these waters. That even this amount has been beneficial, may be seen in the increased catch of whitefish in recent years from Detroit river and lake Erie as shown in the following tables:

Detroit River Catch of Whitefish

1896	19,500	lbs.
1900	9,126	"
1901	20,721	"
1906	30,800	"
1907	150,000	"
1908	140,000	"
1909	175,000	"
Increase from 1900 to 1909 of	165,874	lbs.

LAKE ERIE CATCH OF WHITEFISH

1890	204,332 lbs.
1908	830,189 "
Increase in catch of	625,857 lbs.

If we take the great increase in the catch of fish in the state of Michigan from 33,714,868 lbs. in 1892 to 50,464,000 in 1906, as a criterion, it is probable that the yearly catch by Americans in recent years has been about 130,000,000 lbs. annually, while the Canadian catch in 1905 was only 22,572,300 lbs. and, in 1909, only 28,670,361 lbs. The following statement shows the catch in the waters of lake Michigan, which is about one-third the area of the Great lakes of Ontario, and also the catch in the Canadian Great lakes:

	LAKE MICHIGAN	CANADIAN LAKES
1885	27,294,975 lbs.	27,778,100 lbs.
1892	33,714,868 "	33,328,433 "
1905	44,326,000 "	22,572,300 "
1906	50,464,000 "	23,141,830 "
Total 4 years	155,799,843 "	106,820,663 "

The fishermen of Michigan caught far more whitefish and salmon trout—the best kinds of fish—than the Canadians. The Americans planted several times more whitefish fry in lake Erie than the Canadians.

Following is a comparison of the catch of whitefish in lake Erie:

	AMERICAN	CANADIAN
1880	3,333,800 lbs.	205,090 lbs.
1885	3,531,855 "	186,080 "
1889	3,323,772 "	306,213 "
1899	2,066,314 "	431,022 "
Total 4 years	12,245,741 "	1,128,405 "

The Department of Marine and Fisheries expended for the propagation of British Columbia salmon, and Atlantic salmon more than one thousand dollars per million fry on the average, and these fish are not so valuable per pound as the whitefish in the Great lakes of Ontario, which may be propagated in large hatcheries at a cost of less than $70 per million

fry. A fact probably not known to the public is that British Columbia salmon live only four years, and deposit their eggs only once during their lifetime, averaging 3,800 eggs to a fish. The whitefish lives fifty to one hundred years and yields 35,000 eggs yearly and is more valuable per pound than the British Columbia salmon.

In conclusion, I would say that much remains to be done under systematic businesslike management to arrest the rapid depletion of the whitefish, our most valuable fish. I have conclusively shown (*a*) the value of hatcheries, in the comparisons given above between the American and Canadian fisheries, and also between the lakes of Manitoba and Ontario; (*b*) that the expense of operating small hatcheries is greater in proportion than would be the expense of hatcheries of larger capacity, and, (*c*) also that there is great need of larger hatcheries run at full capacity. Further, I have indicated where it is absolutely certain that eggs from the finest species of whitefish in Canada can be obtained in great quantities, and that there is an actual need for propagating all fry obtainable. I have no hesitancy in stating that the subordinates of the Department refused to obtain eggs from Detroit River fisheries at one third the expense per million which they paid at lake Ontario and, in consequence, the hatcheries were often only half filled. In recent years a number of incorrect reports have been given to the Department and this statement can be verified by reference to the Blue Book.

I have also recommended the use of a larger number of pound nets and fewer gill nets. In addition to reasons above given, the loss of fish caught in gill nets during stormy weather is very great. To my own knowledge, 19,500 whitefish have been lost in two lifts of about 80 gill nets at George island, lake Winnipeg. These nets could not be lifted because of stormy weather, and thousands of fish decayed in them.

According to the last two reports of the Department of Marine and Fisheries, Parliament voted $644,600 for fish breeding, of which the department expended $370,908, leaving an unexpended balance of $273,692. I strongly recommend that all money left unexpended be used solely for the purpose of the propagation of whitefish fry for the Great lakes of Ontario, since they are the most valuable commercial fish in Canada.

WHITEFISH AREAS IN THE GREAT LAKES

The accompanying maps of whitefish areas in the Great lakes are reproduced from an article by Paul Reighard, of the University of Michigan, on "A Plan for Promoting the Whitefish Production of the Great Lakes."[a] In explanation of the maps the author makes the following statements:

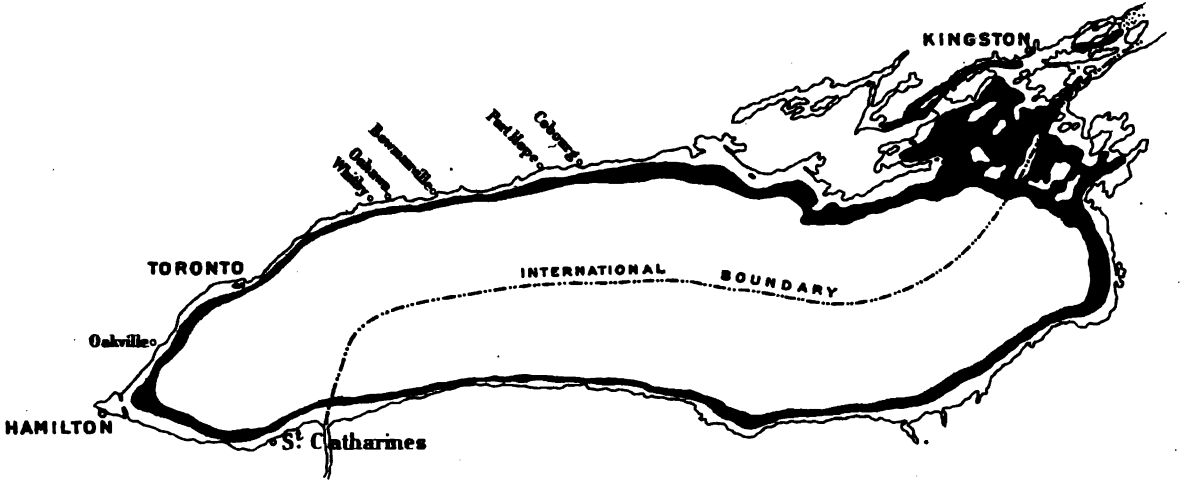
"In the accompanying maps we have attempted to indicate the extent of the whitefish areas for each of the Great Lakes. These are the areas within which the fishermen find the whitefish when carrying on commercial fishing operations at other times than during the fall and spring migrations. They are the areas over which it is, or has been, profitable to fish and outside of which the whitefish is found in relatively small numbers. The maps have been made by tracing the appropriate fathom lines on the United States engineer charts of the Great Lakes. They are sufficiently explained in the legends attached to them. In the following table we have given the whitefish areas for each of the Great Lakes together with the extent in square miles of the lakes themselves. These whitefish areas have been obtained by measuring with a planimeter the areas plotted on the maps. The lake areas are taken from H. M. Smith, 1894.

AREA OF EACH OF THE GREAT LAKES, WHITEFISH AREA OF EACH, AND PERCENTAGE OF WHITEFISH AREA

	Total area	Whitefish area	Percentage of Whitefish area
	Square miles	Square miles	
Lake Superior	32,000	7,400	23
Lake Michigan	22,000	2,600	12
Lake Huron	21,000	9,400	45
Lake Erie	9,500	4,100	43
Lake Ontario	6,500	2,200	34
Total	91,000	25,700	28

"It is to be noted that the area occupied by the true whitefish is relatively least in Lake Michigan, where it forms but 12 per cent. of the lake area. Lake Erie comes next with a whitefish area 14 per cent. of its total area, if the eastern part of the lake only is taken, but if the western platform of Lake Erie be included over depths of 12 to 30 fathoms, its white-

(a) Bulletin of the United States Bureau of Fisheries, Vol. XXVIII, p. 645.



Commission of Conservation
Canada

LAKE ONTARIO

Whitefish area (shown in black) 10-20 fathoms

Scale, 35 miles = 1 inch

(Reproduced from "Plans for promoting the Whitefish Production of the Great Lakes", in Bull. XXVIII. U. S. Bureau of Fisheries

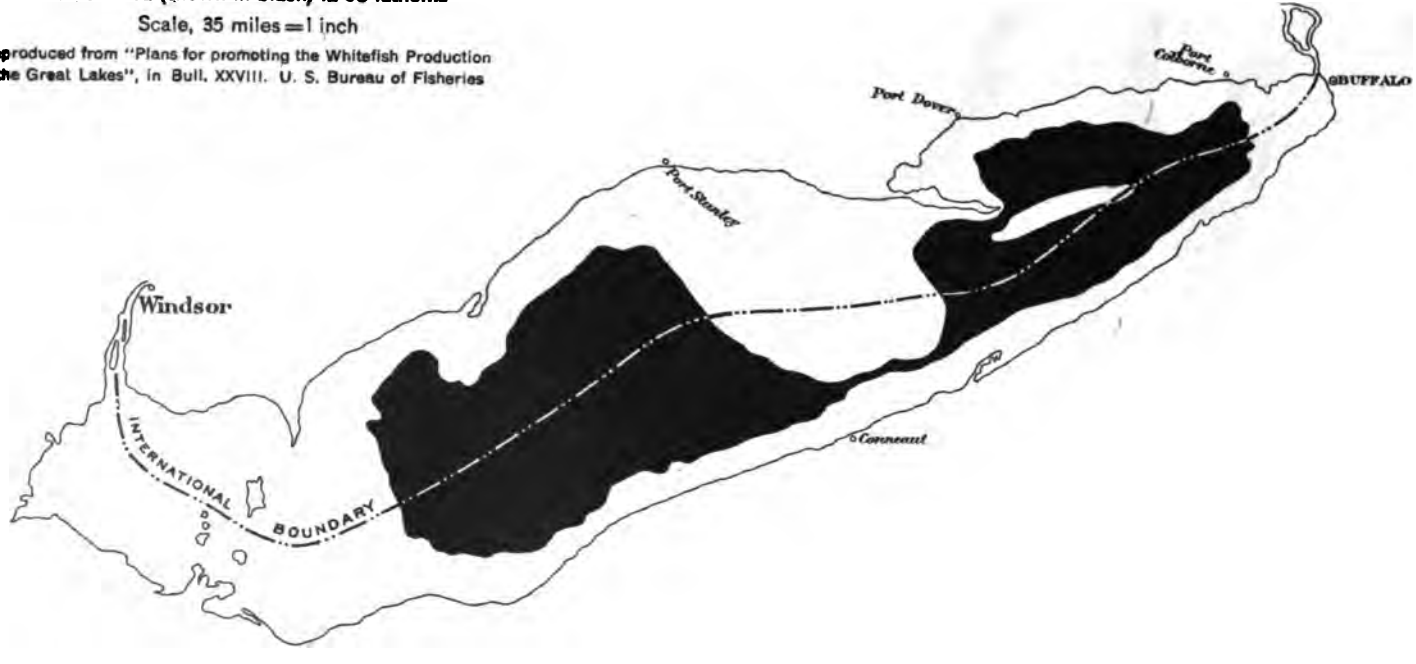
Commission of Conservation
Canada

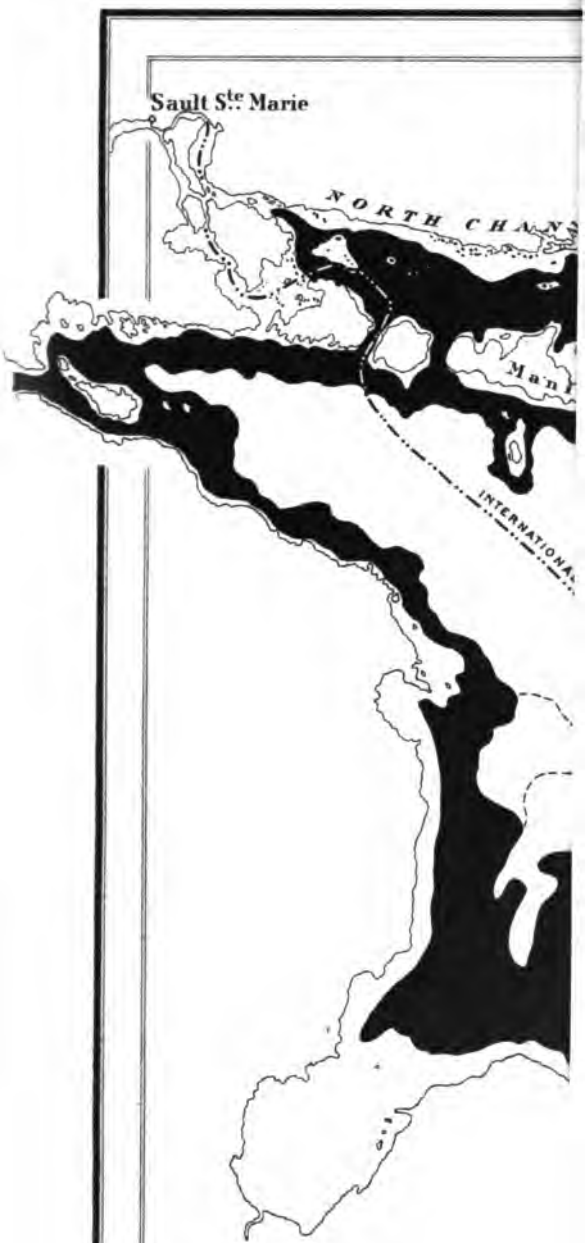
LAKE ERIE

Whitefish area (shown in black) 12-30 fathoms

Scale, 35 miles = 1 inch

(Reproduced from "Plans for promoting the Whitefish Production of the Great Lakes", in Bull. XXVIII. U. S. Bureau of Fisheries





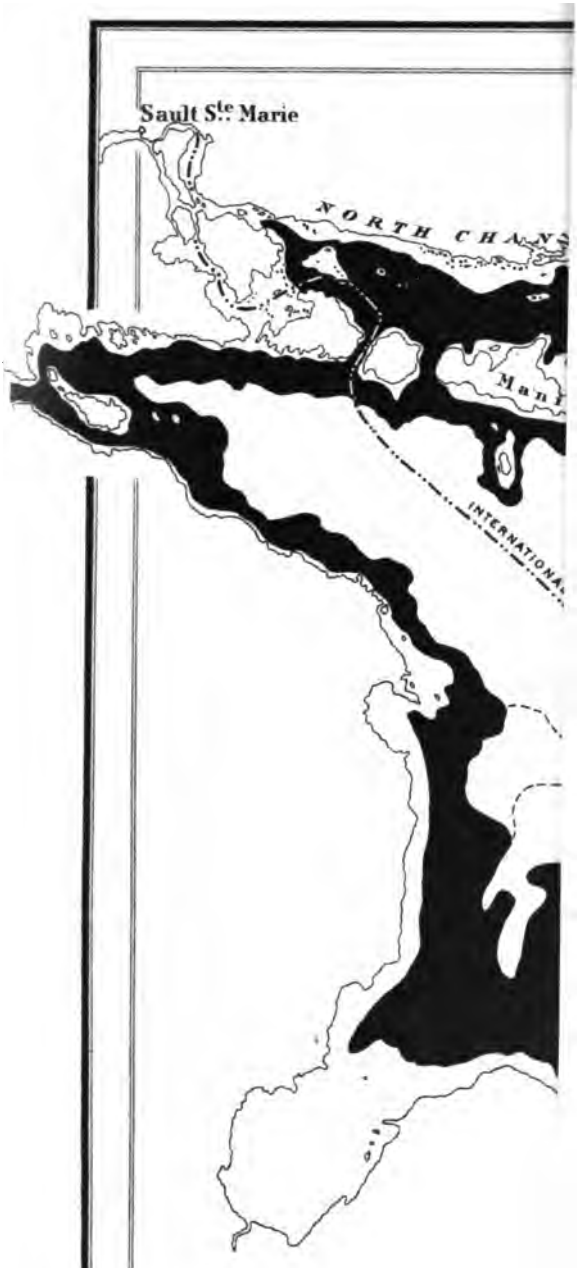
Commission of Conservation
Canada

LAKE HURON

Whitefish area (shown in black) 10-35 fath

Scale, 35 miles=1 inch

Reproduced from "Plans for promoting the Whitefish Production of the Great Lakes", in Bull. XXVIII. U.S. Bureau of Fisheries.



Commission of Conservation
Canada

LAKE HURON

Whitefish area (shown in black) 10-35 fath

Scale, 35 miles=1 inch

Reproduced from "Plans for promoting the Whitefish Production of the Great Lakes", in Bull. XXVIII. U.S. Bureau of Fisheries.

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fish area is raised to 4,100 square miles, or 43 per cent. of that whole area. Whitefish are taken on those parts of the platform of suitable depth, but in relatively small numbers.

"An examination of the whitefish areas as platted on the accompanying maps tends to strengthen this view of the local habit of the whitefish. In Lakes Superior, Ontario and Michigan we see this area stretching in a relatively narrow zone along the whole shore. This zone incloses a central area of deeper water which separates the whitefish area of one side of the lake from that of the other side and is probably never crossed by these fish. Within it occur the blackfins and longjaws. In Lake Huron we see a similar condition of affairs for the main lake, but in Georgian Bay we find the greater part of the area taken up by whitefish grounds. Here the deep water is not central in the whitefish area but is displaced toward the southwest so as to leave the marginal whitefish area very narrow on one side of the lake and very broad on the other side. In the North Channel of Lake Huron a continuous whitefish area occupies its center uninterrupted by a deeper middle water. In this lake the reef which cuts obliquely across the main lake is said not to harbor whitefish in commercial quantities and not to afford them spawning ground. It is therefore not included in the whitefish area, although of suitable depth, and its extent is indicated on the map in outline only."

FISH CULTURE IN CANADA

During the past year 1,024,282,000 fry were planted in Canadian waters by the Dominion fish hatcheries. Some idea of the extension of this work may be had if we remember that the number of fry planted in 1905 was 627,541,000, while in 1900 it amounted to only 265,941,000. Notwithstanding the enormous output of our hatcheries in 1909, we cannot yet rival the production of those of the United States, which, in that year, planted 3,107,131,910 fry.

FRY PRODUCED BY DOMINION GOVERNMENT HATCHERIES

(000 omitted)

1868–73	1,070
1874	510
1875	1,570
1876	9,655
1877	13,451
1878	27,042
1879	21,684
1880	21,013
1881	22,949
1882	55,799
1883	83,784
1884	53,143
1885	81,067
1886	76,714
1887	79,273
1888	88,109
1889	47,699
1890	90,212
1891	115,772
1892	135,959
1893	258,314
1894	254,919
1895	294,040
1896	202,459
1897	198,859
1898	192,477
1899	222,350
1900	271,996

1901	203,540
1902	271,301
1903	314,576
1904	473,258
1905	627,541
1906	657,925
1907	813,979
1908	682,545
1909	1,024,282

The number of hatcheries in operation, of course, shows a corresponding increase. In 1900, there were 12, in 1905, 28, and last year the number was 37. In other words, the number of hatcheries in ten years has increased by nearly 210 per cent., and the output by about 285 per cent.

The government fish and lobster hatcheries are located throughout the Dominion as follows:

(a) Nova Scotia: Bedford, Windsor, Margaree, Bay View, Canso.

(b) New Brunswick: Restigouche, Miramichi, Grand Falls, Shippigan, Shemogue.

(c) Prince Edward Island: Kelly pond, Charlottetown, Georgetown.

(d) Quebec: Magog, lac Tremblant, Tadoussac, Gaspe, lake Lester, St. Alexis.

(e) Ontario: Ottawa, Newcastle, Sandwich, Wiarton, Sarnia.

(f) Manitoba: Selkirk, Berens river.

(g) British Columbia: Granite creek, Skeena river, Harrison lake, Pemberton, Rivers inlet, Babine, Stuart lake, Nimpkish.

The total expenditure in 1909 on fish culture in Canada was $180,345. The amount voted for this purpose was $322,300; so that approximately 56 per cent. of the authorized amount was expended. The expenditure for each province, and the number of hatcheries in each, was as follows:[a]

	EXPENDITURE	NO. OF HATCHERIES
Nova Scotia	$ 15,722	5
New Brunswick	21,102	5
Prince Edward Island	8,130	3
Quebec	19,292	8
Ontario	22,614	5
Manitoba	14,386	3
British Columbia	66,847	8
General Account	12,240	

[a] Cents omitted.

FISHERIES OF PRINCE EDWARD ISLAND

By E. T. Carbonell

Secretary of the Fish and Game Protection Association, and Game Inspector of Prince Edward Island

Although the area of Prince Edward Island is comparatively small, the income derived from fish and game, when considered in connection with the area, exceeds that of most of the other provinces of the Dominion. Still, the present value of the fish and game to the Province is but a fractional part of that which it most assuredly would be if proper conservation measures were adopted.

The province of Prince Edward Island has an ocean-lapped shore of about three hundred and eighty miles, intersected by numerous bays, and marsh-bordered creeks and tidal rivers. It is studded with both fresh-water and salt-water ponds and numerous small lakes. These natural advantages make it not only the ideal habitation for many species of food fish and resident game birds but also the most attractive resting place and feeding ground for wild geese, brant and other migratory game birds on their northern and southern flights.

Unfortunately for the Province, neither the food fish, the game fish nor the game birds are as plentiful as they were thirty or forty years ago, owing, doubtless, to the suicidal policy which has been followed, of catching and killing all that was possible in any manner and at any time opportunity offered. The food fish and crustacea are becoming scarcer and scarcer each succeeding year. Last year the output showed a decrease in value of $181,067.56 from the previous year. On the other hand, the game fish and game birds during the past five years have shown a great increase in numbers in consequence of the increased measure of protection they have received during those years. This is a strong argument in favour of the conservation of all fish and game.

Game Fish

Salmon

The industry of salmon fishing is but little attended to in this Province, the catch last year being less than 5,000 pounds. There is a hatchery at Kelly pond maintained at a cost of nearly $2,000 a year, from which hundreds of thousands of salmon fry are distributed among the various rivers. Last season over one million were so placed. Every fall the rivers of the Province are invaded with vast numbers of salmon, which go up the rivers to spawn. These are the genuine *salmo salar*, which return to the salt water after spawning

and do not then die immediately, as is the case with the salmon on the Pacific coast. Unfortunately, but very few salmon are tempted to enter the inland waters during the open season when their flesh is good for food; for there are no spring-water rivers on the Island which they can possibly reach to clean themselves, as in New Brunswick and Nova Scotia. The only salmon taken, therefore, are those captured in nets off the exposed headlands, with the exception of the few spent fish which are taken in the spring of the year in the Morell river while on their way to the salt water. These fish readily take either the fly or bait, but are unfit for food. Owing to the natural conditions, nothing can be done to render this industry of any great value. It is very doubtful if even the placing of fishways in the dams would be of much value so far as the salmon fishery is concerned.

Trout

During the summer months the tidal rivers of the Province are inhabited by great numbers of the beautiful Greenland trout (Canada salt-water trout). These fish offer every possible inducement to the angler, as they are numerous and gamey, while their flesh, which is a bright reddish pink, is a great delicacy. They vary in weight from half a pound to three pounds each. During the last five years they have been fairly well protected, and, in consequence, they have vastly increased in numbers in spite of the large catches that have been made. The mill-ponds of the Island and the streams above the dams on the rivers are filled with the offspring of the Greenland trout which were imprisoned when the dams were erected. These fish, being prevented by the dams from making their annual pilgrimages to the sea, have deteriorated so much as to have become of little or no value, either as a game fish or as an article of food. Not only have their gamey characteristics been lost, but their bodies have become soft and slimy. Their flesh, having lost its firmness and bright pink colour, has become flabby and of a dirty white hue, with no trace of the original delicate taste. An efficient fishway erected in every dam would permit these fish to make their needed trips to the sea and in one season they would recuperate and thus again become of value.

The streams above the dams require to be stocked with the fry of brook trout, or other fresh-water fish, and, if the hatchery at Kelly pond were to be devoted to the hatching and distributing of such fish, it would be doing a much more valuable work than it does now in hatching salmon from which the Island receives little or no benefit.

The dates at which the sea trout make their appearance in the undermentioned harbours, or begin to ascend the rivers named below are approximately as follows:

Charlottetown harbour ..... May 24th.
Rustico harbour ..... May 15th.

New London harbour	May 1st.
Souris harbour	First spring tides in May.
Corran Ban	May 5th.
Summerside harbour	First spring tides in May.
Dunk river	June 1st.
East and West rivers	June 26th.
Fortune river and Rollo bay	First spring tides in May.
Winter river	July 12th.
North river	June 26th.
Wheatley river	June 15th.
Belle river	June 1st.
Souris river	June 1st.
Pierre Jacques river	June 10th.
Johnson river	Aug. 1st.

Food Fish

Cod

For some reason cod fishing is not now being as vigorously prosecuted as it was a few years ago, a trifle less than 2,464,000 lbs. having been taken last season. Happily the dogfish, those scourges which have caused so many fishermen to retire from the industry in disgust, are either moving away to other quarters or, for some other reason, decreasing in numbers. This decrease is claimed by some to be due to the vast increase in numbers of the fish-eating birds which prey on the young dogfish. These birds have been protected around the coasts for several years. It is to be hoped that, with the disappearance of the dogfish plague, many former cod fishermen may be encouraged to again engage in the industry.

Haddock

Haddock fishing, like cod fishing, has not been prosecuted with as much vigour as formerly, fishermen having become discouraged by the dogfish. The haddock catch last year amounted to 134,736 lbs. of dried fish and 43,400 lbs. of fresh. The disappearance of the dogfish will again induce men to engage in this industry.

Hake

Hake fishing continues to hold its own. The catch last season was nearly up to the average of 1,200,000 lbs. a year. The slight decrease in the catch from that of the previous year was owing to the exceedingly stormy season and the consequent danger of staying out on the fishing grounds during the night time in the very small craft which the fishermen use.

Herring

The herring fishery industry appears to be on the increase. There was, however, a shortage last year in Kings county, but it was more than made up by the increased catch in Queens and

Prince counties. The total catch last season was 12,000 bbls. salted herring, besides 80,000 lbs. which were disposed of fresh or smoked, and many thousands of barrels which were used for bait.

Mackerel The catch of mackerel last year amounted to 1,338 bbls. salted, which realized $15 per bbl., and 40,400 lbs. fresh, which were disposed of at 12 cents per pound. Experience tends to show that on whatever coast lobster fishing is vigorously carried on, mackerel become correspondingly scarce.

Smelts The smelt fishing industry in this Province is in a thriving condition. Smelt nets to the number of 1,145, valued at $10,115, were in use last season, and the catch amounted to 857,550 lbs., which realized $51,453. These fish were, for the most part, shipped in a frozen state to either Boston or New York. Profitable as this industry is at the present time, it is unreasonable to expect it to continue so for any great number of years unless some measures are adopted to ensure the returning to the water, while they are yet alive, of all the undersized fish taken in the bag-nets. When a big haul is made, it frequently happens that all the small fish are dead before the culling of the take is completed, and the unsaleable fish are shovelled back into the water.

Alewives The alewives, or gaspereaux fishery, is by no means as vigorously prosecuted as it might be, the catch last year amounting to only 500 bbls., which sold at the rate of $4 per barrel. The inland waters of this Province actually teem with these fish at certain seasons of the year.

Crustacea

Lobsters Prince Edward Island is particularly adapted to the industry of lobster fishing. Lobsters can be found everywhere along the coasts of the Island, and the coast line is indented with innumerable small bays and creeks which form good harbours for the boats engaged in this industry. The industry is of such great importance that it should not be allowed to die out for the want of proper conservation.

There are in the Province, at the present time, 187 canneries, valued at $145,818, in which 2,429 men are employed. To supply these canneries 350,505 traps, valued at $240,474, were set out last season. The pack for the season amounted to 2,255,898 lbs., and, in addition, 1,850 cwt. were disposed of fresh in the shell. The lobsters packed, however, were, for the most part, very small in size. The practice of canning such very small lobsters, if permitted to continue, must of necessity prove fatal to the lobster packing industry. If this industry is to be perpetuated,

all the traps used must be fashioned so as to prevent the small lobsters from being caught. The fishermen are usually indifferent as to what becomes of the small lobsters taken in the traps, as they are very destructive to the bait. A size limit never saved the lives of many lobsters; traps must be so formed that either the small lobsters cannot enter them, or else be made sufficiently open so that the small lobsters cannot be retained therein. The present system of killing so many small lobsters to fill a single can, when, in one year, those same lobsters would fill three or four cans, is detrimental alike to the interests of the packers, the fishermen and the industry.

The Dominion Government is operating two lobster hatcheries on the Island: one at the entrance of Charlottetown harbour, and the other at Georgetown. These two hatcheries cost $6,453 last year for maintenance, but from them 148,000,000 young lobsters were returned to the waters from which the eggs were taken. Under the former system all these lobsters would have been lost. This is doing much to perpetuate the industry, but if these small lobsters are allowed to be killed before they arrive at maturity, the results will be largely nullified.

Oysters

That the quality of the Prince Edward Island oyster is excellent is universally acknowledged; the Malpeque oysters which grow on the natural beds in Malpeque bay are especially noted and prized throughout the continent. In the past, the natural, oyster beds have been constantly fished, regardless of seasons or regulations, and, as a natural consequence, they have become rapidly depleted, some beds being entirely exhausted and others only yielding pecks where thirty years ago they yielded barrels. The output from the natural beds last year amounted to 13,519 bbls., which sold on an average at $7 per barrel.

There are, at the present time, about 4,300 acres of producing natural oyster beds in Prince Edward Island, but this is only a fraction of the area that could be made productive if artificial oyster culture were carried on as it is in the United States and in Europe. This would require the expenditure of considerable capital and industry, but that it would be a very profitable expenditure is beyond cavil, as the conditions are extremely favourable for oyster culture on practically the whole coast of the Island.

Quahaugs

Last season 12,378 bags of quahaugs were taken, and they were sold for $24,756. This was a slight increase over the catch of the previous year. The increase was due to the fact that a much larger number of men were engaged in the fishery, the catch per man being far short of that of the previous year. At the rapid rate of depletion of the quahaug beds, the time cannot be far distant when all quahaug fishing in this Province will be at an end.

Clams

Although clams are very plentiful and of a good size, as well as of a splendid quality, but little attention is paid to them, the total output last year being only 410 bbls., which sold for $4 per barrel, and 300 cases of canned clams, which brought $4 per case. The supply appears to be almost inexhaustible.

License Fees

Every lobster packer and all persons engaged in fishing for quahaugs, oysters or smelts, as well as all non-residents angling for trout, are required to take out licenses before they commence fishing. For these the following fees are required:

Lobster packers: $5 for first hundred cases packed and $2 for each succeeding hundred cases.

Quahaug fishermen: $1 each.

Oyster fishermen: 50 cents each man.

Smelt fishermen using gill-nets: One cent for every fathom of net used.

Smelt fishermen using bag-nets: $2 per net.

Non-residents angling for trout: Foreigners $5, British subjects $2.

Open Seasons

Quahaugs: From May 1st to June 30th and Sept. 1st to Sept. 30th.

Oysters: From October 1st until the ice forms over the rivers.

Smelts: With gill-nets, from Oct. 15th to Feb. 15th.

Smelts: With bag-nets, from Dec. 1st to Feb. 15th.

Lobsters: Queens and Kings counties, April 26th to July 10th. Part of Prince County, from May 25th to August 10th.

Trout: From April 1st to September 30th. See sec. 26 of the Act.

The Warden System

The warden system, as at the present time sustained by the Dominion Government for the conservation of the fisheries of the Province, costs that Government about $10,000 a year. The staff of fishery officers consists of an inspector, four overseers and about seventy wardens. This system, in so far as the fisheries of Prince Edward Island are concerned, has outlived its usefulness and should be replaced by one that is more efficient.

The amount of money being now annually expended in supporting the warden system, if judiciously used, would be sufficient to effectually put a stop to all fishing at illegal seasons and by unlawful means. A clerk in the fishery office to keep the statistics and receive information, together with a force of six detectives under the supervision of a strenuous officer, similar to the Mounted Police of the North West, could easily be supported by the sum now expended; and their efforts, if judiciously directed, would not only do the work that the wardens have failed to do, but would cause Prince Edward Island to become the ideal summer resort for foreign anglers.

FISHERIES OF MANITOBA

On March 16, 1909, a Commission was appointed by the Dominion Government to investigate the fisheries of Manitoba. Complaints had been made that the existing regulations applying to the Western Provinces, were out of date and unsuited to present conditions. These regulations, in fact, applied to all of Manitoba, Saskatchewan, Alberta and the North West Territories, and one of the important tasks of the Commission was to recommend that a separate set of regulations should be put in force, applying only to Manitoba and Keewatin waters.

The Commission, as finally constituted, consisted of Prof. E. E. Prince, chairman, J. B. Hugg, and D. F. Reid. The principal recommendations made are here quoted without any opinion being ventured as to their justness or accuracy.

In their report the Commissioners state that:

Licensing System

"The one marked abuse in connection with the regulations which have for over twenty years been in force, has been that, while a distinction was drawn between commercial licenses and domestic licenses, there actually existed no such distinction in practice. Domestic licenses have been constantly used for commercial purposes, and it has been a matter of common criticism that the idea of the domestic license has never been carried out at all. In our present recommendations we meet this difficulty by abolishing the commercial and domestic license and by providing for fishing licenses only, apart from the settler's permit for fishing for his own use.

"It has appeared to us necessary to provide for only one type of fishing license, namely, the license to be used by the genuine fisherman, one license for summer fishing and another license for winter fishing and, instead of the domestic license to be used for food purposes, it has appeared to us that the issue of a settler's permit would amply suffice. Under this permit any settler or Indian can fish at any time for his own domestic needs.

"Inasmuch as tugs are absolutely necessary on the lakes, we have provided for a special tug license, which will enable these vessels to do limited fishing, otherwise there was the possibility that steam tugs would not be operated in towing boats of the fishermen, an important accommodation, unless such tugs had some fishing privilege accorded them. As a matter of fact, this commission has abolished the Commercial Company's license altogether, the object being to remove all control by commercial companies or combines, and to place the fisheries, as far as possible, in the hands of the *bona fide* fishermen."

Heretofore the method of issuing licenses has been exceedingly cumbersome, and has led to great laxity in the enforcement of the fishery

regulations. Concerning this matter, the Commissioners reported as follows:

"Apart from the question of insufficient supervision and control of fishery operations, there is one point of considerable importance respecting the matter of issuing licenses which we think has had a good deal to do with the laxity on the part of the fishermen and the fishing firms in the observance of the regulations. The method of issuing licenses requires to be greatly improved. We find that it is the rule for all licenses to be made out and issued by the department in Ottawa. The method is as follows:—Applications are sent in by the fishermen to the Inspector of Fisheries in the province, who enters them on official forms and forwards them to Ottawa with his remarks and recommendations and with the requisite fee. For effective supervision of the fishing operations, the license should be issued immediately, so that it may be in the hands of the fisherman before he begins to fish. But this we find is never done, and, under the present cumbersome and roundabout system, the fisherman, as a rule, goes to the fishing grounds, carries on his fishing operations for several months, and, on his return from the fishing grounds, may then possibly receive his license, though we have found that as long a period as five or six months may elapse after the fishing is all over, before his license reaches him. Thus, his license which is his authority for commencing to fish and for carrying on fishery operations, is never in his possession until long after the fishing is completed. This grossly lax method has a tendency to render the license, and the conditions attached to it, unimportant in the eyes of the fisherman. He goes to the fishing-ground before he has received his license, and not knowing whether he will receive a license at all. He has no means of becoming acquainted with the fishery regulations which are printed on the back of the license, and there is no doubt that a large number of the fishermen never see the conditions of the license until long after the fishing is started. The present system calls for a radical change, but, in addition to the serious laxity arising from the non-issue of the licenses, there is an absolute necessity for the reorganization or for the modification of the official fishery staff in the province if any effective improvement in the observance and enforcement of the law is to be accomplished."

Supply of Whitefish

For many years, there have been constant complaints that Manitoba waters were being over-fished, and that there was real danger that the whitefish industry, especially, was being seriously affected. Concerning these reports the Fisheries Commissioners speak as follows:

"The Commission, in reviewing the reports and records of the Manitoba fisheries for over thirty years, has been struck by the continual recurrence of the complaint that the lake Winnipeg and Manitoba waters were being over-fished, and that the total depletion of the fisheries was threatened. These fears have happily never been realized, and it is a proof of the wonderful productivity of lake Winnipeg and the Manitoba waters that, in spite of the abuses to which we have referred, and in spite of the over-fishing, the yield of fish has

marvellously kept up, and that, notwithstanding a prevalent feeling of uneasiness in regard to the present condition of these waters, with the restrictive regulations which we now recommend there is, in our opinion, no fear of the exhaustion of these fisheries in the immediate future.*

ANNUAL CATCHES ON LAKE WINNIPEG AND SUGGESTED LIMITATION

"We have taken special pains to ascertain with as much accuracy as possible, the total annual summer catches of whitefish in recent years. The difficulty of collating from the official published reports accurate totals of the catches in different years has been great, owing to the lack of uniformity in the statistics, and the inclusion of winter-caught and fall-caught fish. These, and other confusing methods, however, we have elsewhere referred to. The following figures we believe to be as accurate as it is possible for such fishery returns to be.

SUMMER-CAUGHT WHITEFISH—LAKE WINNIPEG

	In the round
1904	5,244,194 lbs.
1905	3,780,188 "
1906	3,565,908 "
1907	1,272,000 "
1908	2,335,000 "
1909	2,162,298 "
1910	2,469,845 "

"The total catch specified in the regulations for 1910 required that not more than 2,400,000 lbs. of whitefish should be taken; but the last lifts of fish, just before the season legally closed were far heavier than the most experienced men could have foreseen. As a matter of fact, during the last few days of the season, a reduced amount of net was placed in the water in order to avoid any excess in the catch over the specified legal quantity, but the total catch was as stated above. There was also an undoubted misunderstanding in regard to the total catch as defined in sub-section 4 of section 12 of the regulations, dated April 18, 1910, which was regarded as applying to whitefish 'in the round,' whereas on the lake it was generally understood by the fishermen and the fish buyers that the total quantity specified was to apply to 'dressed' fish. In the recommendations we make in the present report, the limit we specify is for 'dressed' whitefish. It is generally held by practical men in the fish business that the difference between the 'dressed' fish and fish in the 'round' is about one-eighth of the total weight.

"Considerable dissatisfaction arose from the fact that in the order in council the expression 'In the round' was used, which, of course, considerably reduced the total amount of fish, and the proportions

* In 1904, in the period of unrestricted fishing, the catch of summer-caught whitefish in the round in lake Winnipeg, was 5,244,194 lbs. as given above; while in 1909, the last year of the unrestricted fishing period, it was 2,162,298 lbs.

which, by arrangement, each company was prepared to handle. From the information which has been placed before us there is strong reason to believe that the limit of 2,400,000 pounds was not originally intended to refer to 'round' fish, but to 'dressed' fish, and our recommendation would, therefore, be, that a maximum limit of the summer catch be provided, but that it be placed at 2,500,000 pounds of whitefish in a dressed condition."

Summer Fishing

There has been much difference of opinion as to the advisability of permitting the continuance of summer fishing in Manitoba lakes. It has been asserted that twenty-five per cent. of the summer-caught fish were lost owing to storms preventing the overhauling of the nets regularly, and the fish being left in the meshes, died and polluted the lakes. The Commissioners treat this question at some length. They say:

"To the main portion of the interim report, unanimously agreed to by the commission as a whole, there were added two majority reports, each bearing the signatures of two members of the commission—one report distinguished as addendum A (page 11 of the interim report) which urged that lake Winnipeg had reached such a serious condition in the opinion of the majority that the total closing of the lake to all summer fishing was justifiable, commencing with the present year 1911, such closure to continue until evidence was forthcoming that the fishery resources of the waters named had recovered in a measure their former plentitude. This recommendation for closing lake Winnipeg was adopted by the department, and would have come into force during the present year, 1911, in the ordinary course of events. By order in council, dated April 18, 1910, sec. 12, sub-sec. 9, it is provided that—'after the year 1910, commercial summer fishing shall be prohibited in lake Winnipeg.'

"The second majority report, distinguished as Addendum B (page 12 of the interim report), suggests that there should be a limit imposed on the annual catch of whitefish taken during the summer season, June 1 to August 15, and this recommendation of two out of three of the commissioners was adopted by the department commencing with the summer fishing operations of 1910. By order in council above named, sec. 12, sub-sec. 9, it was provided that—'During the summer commercial season of 1910, not more than two million four hundred thousand (2,400,000) pounds in the round of whitefish shall be taken. As soon as such quantity is caught, the Inspector of Fisheries shall order all nets to be taken out of the water.'

"With respect to the closing of lake Winnipeg, we feel bound at once to call attention to the important fact, that evidence of the decline of the fishery resources of lake Winnipeg to the serious extent generally alleged has not been amply borne out by our subsequent investigations; but that, in spite of the excessive fishing, or overfishing, as has been alleged, the supply of whitefish in lake Winnipeg is still enormous and gives no sufficient ground for serious fear as to the future. The sub-committee which visited the fishing ground after the end of the summer fishing operations, and personally tested special localities which had been abandoned because of the supposed

total depletion of fish, found evidence by setting nets that the depletion was far less serious than had been alleged, and that the means taken for thoroughly investigating the state of these grounds established this remarkable result, that the fears anticipated by many were not realized and that the areas referred to did not show signs of the danger of immediate exhaustion. It is true that the size of the fish appeared to have decreased somewhat, but the quantity of whitefish abounding in these areas had not decreased to the extent that had been commonly claimed. We do not think, therefore, that, in view of this evidence, and in view of the facts ascertained, the continuance of the prohibition of summer fishing is justifiable; and we strongly recommend, therefore, that the first part of sub-section 9 of section 12 of the order in council of April 18, 1910, be rescinded. To close down summer fishing operations in any case would be a most serious step and have far-reaching consequences on the industries of the province. And this important fact must be borne in mind, that lake Winnipeg is the only source of supply for fresh whitefish on which the western Canadian and other markets in the Dominion can depend, and the closing down of summer fishing would therefore deprive a large part of our population of any supply of fresh whitefish during the summer season. The summer fishing is carried on in a part of this great lake, the shores of which are almost entirely without population and not likely to be settled for a considerable time on account of the special nature of the country and its not being adapted for agricultural purposes. The somewhat satisfactory signs which our further investigations have shown as to the state of the fish supply in the northern portion of lake Winnipeg, would not justify, in our opinion, the industrial dislocation to which we refer, viz.: the stoppage of an important fishery enterprise, and the cutting off of a valued and necessary supply of fresh fish for our own local needs in the west and for eastern markets."

Whitefish Size Limit

That something should be done to increase the size of the whitefish caught was recognized by the Commissioners, who state that they are convinced that a minimum size limit for the more important food fishes is absolutely necessary. To quote:

"We, therefore, recommend that certain sizes of fish should be specified in the regulations, below which no fish can be legally captured. We also recommend that the legal mesh of the various nets should be increased. An increase in the size of the mesh of nets means, of course, that quantities of net now legally in use would become useless unless sufficient notice of a change were given and time allowed for wearing out the present nets and for obtaining a supply of new nets of larger mesh. We, therefore, in our present recommendations, have adopted the plan of gradually increasing the size of mesh with a sufficient interval of time to allow the fishermen to provide themselves with nets in accordance with the proposed new regulations. We cannot resist the conclusion that by gradually increasing the mesh in this way less hardship will be felt by the fishermen and the fish firms and the average size of fish taken will, of necessity, be improved. The question has been discussed at great length by the Commission as to the minimum size of whitefish which matures or produces eggs.

The view has been widely expressed that a large quantity of the whitefish taken in the waters of Manitoba, say two pounds or under, have not reached maturity and have never had the chance to spawn. Of course, if vast quantities of fish are captured before they have had a chance to spawn, the result must be serious for the future of the fisheries, and, whatever the facts may be, it seems desirable to increase the average size of fish taken so that the majority of the fish shall have a chance of depositing their eggs or of reaching a mature condition, when their eggs can be utilized for hatchery purposes.

"During the present winter the fact was called to the attention of the Commission that several carloads of whitefish, caught in the waters at the north end of lake Manitoba, were found by the buyers after purchase, to be fish of such small average size, that it was necessary to hold them back until catches of larger size fish could be secured to mix with them before exporting the whole. In this way alone was it possible to raise the average of the shipment to a marketable size. These small whitefish, it is well known to the fishermen, are really a drug in the market, there is so little demand for them. There is practically no sale for such under-sized fish, not exceeding two pounds in weight, and a large quantity of such whitefish, caught during the preceding winter (1909-10) are, the Commission is aware, still held in cold storage at Winnipeg because there has been found to be no sale for them. There appears to be no way of effectually stopping this capture of whitefish, immature and of small size, so long as pickerel or doré nets, of a mesh so small as 4¼ or 4½-inch extension measure, are used on grounds frequented by whitefish.

"We are convinced that it will be absolutely necessary to require the use of nets of not less than 5¼-inch extension measure if such a destruction of small whitefish as that we refer to is found to continue. It would in our opinion be the duty of the Inspector of Fisheries to see if the abuse we refer to ceases and if the capture of small whitefish continues, in the way we have described, the Department should on the report of the Inspector refuse to sanction the issue of licenses for nets of less mesh than 5¼-inch extension measure, on grounds known to be the resort of whitefish. Small meshed nets should not be permitted on any area in the lakes of the province where there is a certainty of whitefish being captured in any considerable quantities,

"The evidence as to the existence of whitefish grounds and of pickerel grounds, that is, of areas where either of these fish predominated during the various fishing seasons, was somewhat contradictory, and the Commission had great difficulty in deciding whether or not any areas of large extent, or defined by fairly definite bounds. could be distinguished and regarded as whitefish grounds, or, on the other hand as pickerel grounds. Fishermen of large experience assured the Commission, in their evidence, that such grounds could be distinguished, while other witnesses stated that both fish occurred on the various fishing grounds and no distinct areas could be separated in the way claimed by other witnesses. The only feasible course appears to be to rely upon the opinion of the Inspector of Fisheries. He could readily ascertain before recommending licenses if it was safe to allow small-meshed pickerel nets or refuse them, and in this way

reduce, or entirely put an end to, the destruction and shipment of small under-sized whitefish for which there is no demand."

Sturgeon

Concerning the sturgeon fisheries the Commissioners have this to say:

"In our interim report of November 26, 1909, page 10, we recommended that the export from the province of Manitoba of sturgeon and of caviar, which is the prepared and cured roe of the sturgeon, be prohibited on and after January 1, 1910. Four reasons had weight with us in making this recommendation, namely: (1) the undoubted decline in the supply of sturgeon in the lakes and rivers of the province. This decline is much greater than the published statistics indicate; and, indeed, the returns during the last four or five years have not indicated catches of sturgeon in Manitoba waters proper, but have included large takes of sturgeon in the Nelson river and in the northern waters in Keewatin, never before commercially exploited. (2) Sturgeon have always been a staple article of food with Indians, and in past years the Department has laid stress on the importance of this fish as a source of sustenance for the Indian tribes, especially the northern tribes. (3) The increased value and the increased demand, especially in foreign markets, for caviare and smoked sturgeon; and the greatly increased prices consequent on this growing demand has stimulated a desire on the part of fish firms to make large catches of sturgeon. Wherever sturgeon occur in Canada, there has been, in recent years, every effort made to capture them, and, it must be added, to exterminate them. (4) The action of the International Fisheries Commission, which, in the code of regulations prepared by them, provide that sturgeon fishing should be stopped for four years, is of weight in this connection.

Limitations Proposed

The following is a summary of the principal limitations on fishing suggested by the Commissioners, for Manitoba waters:

(1) A considerable decrease in the amount of net and gear to be used by the fishing tugs;

(2) The limitation of the total annual summer catch of whitefish

(3) The delimitation of the area to be commercially fished in summer;

(4) A strict observance of the shortened fishing season; and

(5) Confining the main fishing operations strictly to fishermen residing in the Province.

Again, owing to the many representations made by fishermen to the Commissioners, they recommended that fall fishing from September 1st to October 15th be also allowed in the southern portion of lake Winnipeg (see pp. 20 and 21 of their Report), as it is alleged that winter fishing cannot be carried on there to any extent. It was also claimed that fishermen had gone to a great deal of expense in erecting ice houses and freezers for the purpose of caring for this fall catch, and therefore the prohibition

of fall fishing would work a good deal of hardship. In connection with this matter, however, it has been suggested that fall fishing should not be permitted on recognized whitefish grounds, that no more than 1,000 yards of four-inch extension measure of gill net be set, that skiffs only should be used by the fishermen, and that a license fee of $3.00 be levied.

Foreign Fish Companies

The Commissioners state that, until about five years ago, American companies had been controlling the marketing of Manitoba fish. These companies, it was asserted, exported the best fish and sold the poorer grades in the local markets. A commercial crisis in the Western States, however, led these American concerns to sell their Canadian plants, which then passed into the hands of Canadians. This should have meant at least, that the better fish would find their way to the Canadian markets at lower prices than had formerly, been possible for the poorer grades. But no such result has followed.

"While the United States companies now are simply the purchasers of our catches of Canadian fish, they are such heavy purchasers, having contracts with Canadian companies whereby a regular supply of fish in accordance with the requirements of the fish business is secured, that entire freedom from the control of the large firms on the other side of the boundary line is well nigh impossible. The high price of fish which the Canadian consumer complains about arises, it must be admitted, from the methods of the middlemen who acts as a medium between the fish companies and the small retail dealers. The evidence secured in Winnipeg showed that the middleman may make as much as three cents per pound profit on whitefish, whereas the fisherman himself receives on the lake not more than three cents per pound for his fish, and the Canadian companies who handle the fish and store them in their freezers, or ship them fresh on ice, do all this work on a very small margin of profit. It must be remembered that the Canadian companies not only erect and operate freezers and store supplies of ice, build and supply the tugs which are such a convenience to the fishermen in their fishing operations, furnishing supplies and in a multitude of ways facilitating the fishing operations, but they also have the responsibility of the rise and fall of the market, and of maintaining the channels of business generally. These companies operate the fishing stations, supply nets, and make advances to the fishermen without which the industry could not be carried on, and they do all this on a far less margin of profit than the middleman who merely sells the fish to the retail dealers.

"It will thus be seen where the price of fish becomes excessive and we are of the opinion that fish caught in our Canadian waters by Canadian fishermen should be sold to the retail dealers, at the same rate per hundred pounds as it is sold to United States buyers or middlemen. We had abundant evidence that retail dealers applying to the fish companies for supplies of fish were refused on the ground that, under the existing system of selling to middlemen, the fish companies decline to sell to the retail Canadian dealers. If it is possible, by some departmental measures, to carry out an arrangement whereby

the fish companies shall sell directly to the retail dealers at the lowest possible prices, Canadians may then secure as cheap fish and as good quality as do the customers of the large United States companies.

"Under present conditions Canadians when buying fish actually pay a profit to four different persons, viz., (1) the fishermen (2) the wholesale fish dealer (3) the jobber or middleman (4) the retail fish dealer."

Fisheries Patrol

The matter of more rigid patrol of the lakes is one that will require more serious consideration than it has received in the past. There have been frequent allegations of incompetence concerning the inspectors, but when the circumstances under which these men have to work, are considered it is perhaps not so surprising that this work has been but imperfectly done. In the first place, the patrol boat used is too large and slow for such work, and gives early warning of its approach to all persons engaged in illegal operations. Besides, the inspectors are mostly residents who receive but small pay for their services, and can hardly be expected to take the risk of having the ill-will of their neighbours by forcing prosecutions. Then, too, the areas to be covered by the inspectors are much too extensive for thorough work. In this regard, the Commissioners report as follows:

"Few people are able to realize the vast extent of the area which the officers have to cover, and the immense waters which should be regularly patrolled if proper supervision is to be exercised. The scale on which the fishing operations is carried on, both in winter and summer, is most extensive, and it would appear that for interests so vast as the fisheries of Manitoba and Keewatin, there should be a division of labour and that one officer should not have to cover such an immense geographical area as the present conditions require. There should be some central inspector's office in the province, established where the principal officer could be consulted by parties on fishery business. He should have authority to issue licenses and save the serious delay which at present is so great an obstacle to the effective working out of the government's policy of protection and preservation of fish. He should make weekly returns to the department of the licenses issued and remit the fees collected. For the reasons which are apparent, we do not favour the present system of a numerous staff of poorly paid fishery overseers, and a still more inadequately paid staff of fishery guardians. The whole territory should be under the supervision of six or eight active and properly paid fishery overseers, who would have their patrols specified by the principal officer or district inspector."

Hatcheries Needed

That there is an ever increasing need of more fish hatcheries in Manitoba, and, at the same time, a more scientific operation of those already in existence there, seems to have been impressed very strongly on the Commissioners. They assert that some of the hatcheries were not in operation at all for one or two seasons. This

seems to have been mainly due to mismanagement in the matter of procuring spawn. While whitefish were being taken and shipped by the carload during the spawning season, the hatcheries either received no spawn at all, or received it in such bad condition that it was almost entirely wasted. Further, the Commissioners claim that the Selkirk hatchery is not an ideal one for the propagation of whitefish, which ever since its construction has been the principal fish included in its operation. They suggest that this hatchery be used for pickerel, a fish that is yearly becoming more valuable, and, as the Selkirk hatchery is centrally located, it could very well be used for a distributing centre. It was recommended that more pickerel, gold-eye and bass hatcheries be established. The latter fish, if they can be produced successfully, would be a valuable asset to the Province, as they make excellent game fish, in which the waters of Manitoba are singularly lacking.

Biological Investigations

Owing to the lack of accurate information, considerable haziness exists as to the habits and movements of Manitoba fish. The views of experienced fishermen are most contradictory on such important matters as the size at which whitefish first contain spawn, or reach the mature breeding stage. The food of the whitefish seems to be a matter still in doubt in the minds of the most practical men, and very little information is available as to the feeding and spawning grounds of the whitefish, pickerel, sturgeon, gold-eye and other commercial species of fish. To obtain this data the Commissioners advise the establishment of a biological station on lake Winnipeg or some other suitable place.

Extensions of Time

Regarding extensions of time which the Department is frequently importuned to make, the Commissioners comment as follows:

> "The department is, at times, strongly pressed to temporarily modify the regulations, especially in regard to the length of the fishing season. Requests for extension are sent to Ottawa and urged with great force, owing, in some cases, to a serious shortage in the season's catch of fish. It is pointed out, in behalf of the fishermen and the fish firms, that they were prepared to handle as large, or a larger catch of fish than usual, and that they will suffer serious loss if an extension of time be not granted to enable them to make up for the deficiency in the catch. To this commission it appears strange that, during a season in which the fish appear, for some reason or other to be especially scarce, requests should be made for an increased destruction of them, and that a longer time should be allowed, because of the apparent scarcity of fish. In our opinion, when the fish, for some reason, appear to be scarce, that is precisely the time that they should be conserved, and the extensions asked for appear, therefore, to be unwise and unnecessary from a fish protection point of view. Such extensions, we have information to show, have often proved of no

benefit at all to the parties who asked for them. When an extension is asked and the season is lengthened it often results in fishing operations being continued after the stormy season has begun, entailing great loss of gear, and certainly a waste of considerable catches of fish. The seasons specified in the regulations should, in our opinion, be very strictly and closely adhered to, both in the interests of the fish supply and in the interests of the parties who are engaged in the fish industry.

New Regulations Desirable

"As we have pointed out in the body of our report, the existing regulations cover not only the province of Manitoba, but the very different waters of Saskatchewan and Alberta where the conditions are wholly unlike those of the Manitoba waters. Hence, a totally revised set of regulations is necessary, and, as we understand that a new set of regulations is being prepared especially for the more western provinces, be beg to recommend the following series of revised regulations for waters which we were commissioned to investigate and report upon. It will be noticed in this code of regulations which we suggest, that a number of provisions are dropped altogether which have long formed part of the Manitoba regulations, but the time has come for a thorough revision, and we, therefore, beg to recommend the following provisions as suited to the present requirements of the fisheries in question.

General

"(1) Fishing by means of nets or other apparatus without license or permit from the Minister of Marine and Fisheries is prohibited in the waters of Manitoba and the District of Keewatin.

"(2) No license shall be granted to any person unless he is a British subject, resident in the Dominion of Canada, and the actual owner of nets, boats and fishing gear for which the license is granted. Applications from residents living in the immediate locality of the waters applied for shall have the preference in the granting of licenses.

"(3) Any resident settler, including Indian, is eligible for an annual fishing permit to fish not more than one hundred (100) yards of gill-net for domestic use, but not for sale or barter. Such permit shall be issued free, and fishing under it shall be permissible at all times.

"(4) No license shall be transferable unless by special permission obtained from the District Inspector of Fisheries.

"(5) Every person holding a fishing license or permit shall, at the end of the fishing season, make a sworn return of his total catch of fish to the fishery inspector by whom the license or permit was issued.

"Note.—As there are two important fishing seasons, namely, the summer fishing season and the fall and winter fishing season, these returns should be made twice a year, namely, on or before September 30, for the preceding summer fishing, and March 31, for the preceding fall and winter fishing.

"(6) All boats, buoys and nets shall be legibly numbered, by means of tags or otherwise. Boats shall have their number painted

in black on a white ground on either side of the bow, the figure or figures to be not less than 6 inches in height and the numbers on the buoys shall be so placed as to be readily seen without raising them from the water, and the numbered tags on the nets shall be so attached as to be visible when the nets are in boxes or on the net reel. The numbers for all such boats, buoys, and nets shall be furnished by the Inspector of Fisheries for the District at the time of the issue of the license.

"(7) Not more net shall be used or operated under any net license than is specified in the said license, and such net shall not be used or operated by any person other than by the licensee or person in whose name the license is issued.

"(8) Every person or firm buying fish from fishermen, or handling fish after capture by fishermen, shall make a true affidavit on or before March 31, of each year for the fall-caught and winter-caught fish, and on or before September 30, for summer-caught fish, such sworn return or affidavit to specify the kinds of fish bought or handled by such person or firm, and to state the exact quantities of each respective kind of fish purchased from the fishermen, such affidavits to be mailed to the Inspector of Fisheries on or before the dates named above.

"(9) Angler's permits. (The General Fishery Regulations dated October 14, 1907, which have hitherto applied to the Manitoba waters and to Dominion waters generally should continue to apply in the province of Manitoba)."

In addition, a number of special recommendations have been made, dealing chiefly with close seasons, the nature of the nets that may be used in different waters, and other more or less technical matters.

THE FISHERIES OF BRITISH COLUMBIA[a]

The fisheries of this Province are exceedingly rich and are almost unlimited in promise. Although the fishing industry may be said to be now only in its infancy, the growth and development have been truly remarkable during the past few years. To a careful observer, however, this will appear small and insignificant in comparison with that which may be done along the same line in future years.

The province of British Columbia has a sea washed shore of 7,000 miles, with countless islands, bays and fiords forming safe and easily accessible harbours. Along this portion of the Pacific coast, and within the limits of territorial waters, there are fish and mammals in great abundance, while, apart from this immense salt water fishing area, there are, in the numerous lakes of the Province, no less than 220,000 square miles of fresh water, affording the finest possible habitation for many kinds of valuable food-fishes.

Very little has been done, comparatively speaking, for the fisheries of British Columbia as a whole, and their importance claims the closer attention of the Government. On the Atlantic such valuable assistance as the erection and maintenance of bait-freezing establishments, and the granting of bounties, has been extended. It would seem that the need of encouragement is especially manifest on the Pacific, since there the demand for labour of all kinds is so great and other less precarious employments are so inviting. A great deal might be done, by means of special inducements, towards the upbuilding of the fishing industry here.

The Salmon Fishery

Of all the many branches of the fishing industry in British Columbia, the canning and packing of salmon yet remains *facile princeps*, and it is to be hoped, and may with reason be expected, that a continued plenitude of this valuable fish may be ensured by careful methods of conservation, by artificial propagation on a large scale and by the combined efforts of the Government and of the cannery men. All who are connected with, or interested in, the salmon industry fully realize that a plentiful future supply can be rendered a certainty only by the rigid enforcement of close season regulations, together with the operation of hatcheries on an extensive scale; for all are aware that unless a sufficient number of fish are permitted each year to reach the spawning grounds, the time will assuredly come when the sources of supply will have become depleted. This is particularly true of the sockeye salmon.

[a]This article was kindly contributed by the Attorney General's Department, British Columbia.

The former suicidal ideas maintained by many cannery men, both on the Canadian and American side of the international boundary, that the salmon business could not be permanent, and therefore, that every available sockeye should be intercepted and put into a can, are becoming greatly modified, if not altogether dispelled. There is great hope, therefore, that a satisfactory joint system of close season regulations may be adopted by the canners on the Fraser and those on the other side of the line—all working in unison towards a common end: the saving of the salmon industry. This would, indeed, be a "consummation devoutly to be wished."

A similarly satisfactory outlook for the future is now apparent in the other salmon districts of the Province; for this year (1910) a Special Boat-Rating Commission was appointed by the Minister of Marine and Fisheries at Ottawa with instructions thoroughly to investigate conditions in the northern districts, and to recommend an award of boats to be allotted to each division and to each individual cannery. This Commission consisted of men thoroughly acquainted with fishery affairs and eminently qualified for the duty entrusted to them. The results of previous efforts in this direction on the part of the canners themselves—all alive to the vital necessity of a limitation of boats—have been far from satisfactory. This fact led to a rating by the Provincial Government and, later, to the appointment, by the Dominion Government, of the above-mentioned Commission, to make an award of boats for a period of years. The cannery men, weary of constant cavilling and dispute, welcome the promise of some definite settlement and, while it is unlikely that the award of this year's Boat-Rating Commission will be satisfactory to all, yet it would seem to be the introduction of a system by which the canners will better realize their position for the future, and by which the stocking of the spawning-beds each year will be rendered more certain.

There are, in the waters of British Columbia, the five known species of the genus *oncorhynchus*, termed the Pacific salmon. They are distinct from the salmon of the Atlantic, which are of the genus *salmo*. Structurally these fish are only slightly different, but their life history is totally dissimilar, and they are distinctly and positively placed. The greatest difference is presented in the fact that both sexes of all the species found in Pacific waters die shortly after spawning once. This remarkable characteristic, when for the first time brought to the attention of some Atlantic and European authorities, was discredited, as they did not then generally know that the Pacific salmon was different from the *salmo salar*, which, after spawning, does not die, but generally returns to salt water. Thus, while the Pacific fish are not salmon in a scientific sense, they are now the salmon of the world, because of their abundance and their fine canning qualities.

The five species of Pacific salmon, in the order of their commercial importance, are as follows:

(1) The Sockeye, or Blueback (*Oncorhynchus nerka*).
(2) The Spring, or Quinnat (*O. tschawytscha*).
(3) The Coho, or Silver (*O. kisutch*).
(4) The Dog Salmon (*O. keta*).
(5) The Hump-back (*O. gorbuscha*).

SOCKEYE SALMON.—The sockeye run in all the mainland rivers, in some of the rivers of the west coast of Vancouver island, and in the Nimpkish river near the head of the east coast of that island. The abundance of this fish in the Fraser varies greatly with given years—known to the canners as the "big years" and the "poor years." Their movement appears to be greatest every fourth year and the run is poorer in the years immediately following. The causes which may have led up to this most remarkable feature have given rise to much speculation, and many theories have been advanced to account for them. None, however, are sufficiently satisfactory to be generally accepted. The periodicity in the run of sockeye, which is so pronounced in the Fraser, has no marked counterpart in any other river in the Province or on the coast.

The sockeye weighs from three to ten pounds, though specimens weighing seventeen pounds are recorded. The adults in salt water are free from spots, their backs are a clear blue and below the lateral line the colour is an immaculate white. In form and colour, they are considered the most beautiful of their family and the flesh is of a deep and unfailing red.

They enter the Fraser river as early as April, but are not taken till July 1st and their capture is, by regulation, confined to nets of 5½ inch mesh. The main run in the Fraser is looked for towards the latter part of July and is at its height during the first ten days of August.

The spawning period of the sockeye extends from August, in the headwaters, to as late as October and November in the waters nearest the sea, the spawning taking place in lake-fed or in lake-feeding streams.

Very little is known of the life of the young, or the length of time they live in fresh waters before seeking salt water, but the results of observations of late would tend to show that the seaward migration does not take place when the fish are of any one special age, since fry and yearlings have been noticed at the same time making their way towards the sea. Nothing is known of their feeding-grounds in salt water as they are never found in the bays and inlets which distinguish the coast and where the spring and coho are so common. It is thought that their feeding-ground must be in the open sea.

SPRING OR QUINNAT SALMON.—This class ranks second in importance

in the waters of the Province and was the first, and for many years the only, salmon used for canning. The species attains to an average weight of from eighteen to thirty pounds in British Columbia waters, though fish weighing sixty to one hundred pounds have been reported. The head is rather pointed, and of a metallic lustre; the back is of a dark green or bluish colour; while below the lateral line it is silvery. At spawning it becomes almost black; hence it is often spoken of on the spawning-grounds as "black salmon."

It is the most powerfully-swimming fish of all that seek the rivers of the Province, usually journeying to the extreme head of the watershed that it enters. It seems to prefer the most rapidly-moving streams, apparently avoiding the lake-fed tributaries. The colour of the flesh is from a deep red to a very light pink—at times almost white. This uncertainty of colour is mainly responsible for it being less generally used for canning. All specimens are examined by the canners before accepting them from the fishermen, the extremely pale-fleshed fish usually being rejected.

The quinnat enters the Fraser early in the spring and the run continues more or less intermittent until July. In the fall there is no pronounced run.

Coho Salmon.—This species is found in all of the waters of the Province and of recent years has become a considerable factor in canning operations. The bulk of the catch, however, is being shipped in ice to Eastern markets. Its average weight is from three to eight pounds, though heavier specimens are not uncommon. In colour, it is very silvery, greenish on the dorsal aspect and with a few black spots on the head and fins. In August and September the runs take place in the rivers on the north-west coast, and in September and October, in the Fraser.

Like the sockeye, the coho salmon travels in compact schools. It does not seek the extreme headwaters, but frequents both the streams and the lakes to spawn.

Dog Salmon.—These fish run in most of the rivers and coast streams late in the fall. The average weight is from ten to twelve pounds, but much larger specimens are not unusual. In provincial waters, they spawn close to the sea, ascending almost every one of even the minor coast streams. In the sea, they are dark silvery in colour, the fins being black; but during the spawning season they become dusky, with lateral lines of black. There is more or less gray and red colouring along the sides. The heads of the males undergo the most marked distortion, while the teeth in front become large and dog-like; it is from this latter characteristic that the species has derived its popular name. Until a few years ago these fish were not considered of any value, but they are now captured in great numbers by the Japanese who dry-salt them for export to the Orient.

HUMPBACK SALMON.—This is the smallest of the species of salmon found in British Columbia waters, averaging in weight from three to six pounds. In colour, it is bluish above and silvery below, while the back and tail are covered with oblong black spots. In the fall, the males are so greatly distorted as to give them their popular name. These fish run in abundance in the "big years," and then only every second year after, coming in with the last of the sockeye run. They are but little valued, though a considerable demand has sprung up during the last few years. With the development of the markets for cheap fishery products, a demand has come for all the varieties of salmon, with the result that the fishing season is now extended to cover the runs of all five species. This lengthening of the season is of marked benefit to the regular salmon fishermen, and with the development of the other fisheries, it is confidently believed that these hardy men may find ready employment during the entire year.

THE ARTIFICIAL PROPAGATION OF SALMON.—The following salmon hatcheries are in operation in British Columbia:

Bon Accord, Fraser river.
Pemberton, Lillooet district.
Granite creek, Shuswap lake.
Harrison lake.
Babine lake.
Stuart lake.
Lakelse lake, Skeena district.
Oweekayno lake, Rivers inlet.
Nimpkish river, Vancouver island.
and
Seton lake, Lillooet district.

The total number of these institutions does not by any means meet the requirements, and the necessity for many more is recognised by all who are familiar with the situation. The erection of other establishments of the kind, however, is now under consideration, and it may be expected that before very long a larger number will be in operation at the different points where spawning salmon are to be obtained each year in vast numbers.

Hatcheries for game fish, too, especially in the Upper Columbia region, are greatly needed. The vast amount of good that is accomplished by hatcheries towards preventing the depletion of the salmon supply and the building up of this industry can only be comprehended by a careful study of the results obtained elsewhere.

PROVINCIAL FEES.—In addition to the fees charged by the Dominion Government, the provincial authorities impose the following charges:[a]

(a) For a salmon drift-net or gill-net license, $5.

(b) For a salmon drag-seine license, $25.

(c) For a salmon purse-seine license, $5.

(d) For a salmon trap-net license, $25; also a tax of $1 per thousand fish taken.

Halibut

The halibut of British Columbia have an enviable reputation, for they are less overgrown and of finer texture than the Icelandic and North Sea fish; a length of five to six feet and weight of 250 lbs. is exceptional for the British Columbia halibut. The waters between Queen Charlotte islands and the mainland, especially off Rose Spit, and off the west shore of Banks island, were at one time veritably overcrowded with halibut.

Very large fish were often taken then, some weighing 150 pounds, but the general weight now is only from 20 to 60 pounds. The halibut are scattered all over the Strait, but regular migrations have been noticed, and where the waters of Dixon entrance meet the currents, moving from the south through Hecate strait, and food appears abundant, the fish congregate in large numbers.

The method of fishing with steamers and schooners is practically the same as on the eastern coast and, with few exceptions, halibut men are easterners who formerly, when the fish were plentiful, operated out of Boston and Gloucester.

From the middle of September to the middle of March is the principal fishing period, but in May and early June many large halibut move into inshore shallows, especially on the east side of Graham island.

It is generally agreed that the British Columbian halibut banks have seriously deteriorated during the last few years, and it is essential that measures be adopted to save the supply from exhaustion—a fate that has befallen the banks of western and northern Europe and the Atlantic shores of Canada.

Oulachon

This small fish—about the size of a smelt—occurs in great abundance from the Naas river in the north to the Fraser river in the south, appearing from early March to the middle of April. The schools entering the northern estuaries—especially the Naas—are very large; they crowd in so thickly that the Indians, from an early period, have been accustomed to make large catches by crude methods, the chief of which is the use of a long pole with numbers of nails inserted about

[a] For special Dominion regulations applying to British Columbia, see p. 56

one and a half-inches apart and projecting like the teeth of a comb. By drawing this implement quickly through the dense school of fish the Indian impales a great number, which he shakes off into his canoe; in a very short time he can obtain a boatload in this primitive manner. Seines are used in some localities, as also are small-meshed gill-nets.

The tissues of the oulachon are teeming with oil—so much so that it is called the "candle fish," for by simply inserting a piece of pitch through the centre of it when dried, it may be used as a candle or torch, the pitch burning like the wick of a well-filled lamp.

The Indians are accustomed to press out the oil into vats. It is greatly esteemed by them, although it quickly turns rancid and is very offensive in odour. It is consumed by them in the same way, and to the same extent, as butter is with more civilized folk.

Herring

The superabundance of herring on the coast of British Columbia has been recognized from early times, but, as the local demand was insignificant, no herring fishery can be said to have existed until about thirty years ago. At intervals, and in a desultory way, various parties engaged in the herring industry and quantities were converted into oil and guano. Within the last ten years, however, the value of this fishery resource has been slowly realized.

Herring occur practically all along the coast as far as Alaska, though in sheltered areas, like the waters near Nanaimo, Ucluelet, Barkley sound, Virago sound, and Queen Charlotte islands, the schools appear to form solid phalanxes. At Nanaimo, they are plentiful from early in November to the New Year, vast schools appearing in February, while even as late as June immense quantities have been seen moving out in the strait of Georgia.

There are many methods of putting up herring, but the greatest demand is for the salted article in pickle, and there is no reason why the Province should not put up as large a pack of the best herring as Scotland, which produces annually 250,000 to 350,000 tons, valued, when pickled and ready for market, at no less than $5,000,000 to $6,000,000.

It will thus be seen that while the fisheries of Nanaimo are still in their infancy, the possibilities of the herring industry are large and, properly conserved and exploited, it will become a valuable source of revenue to the whole district.

Sturgeon

The sturgeon fishery of the Province was neglected until recent years, but in 1897 the Fraser river inspector reported that "the sturgeon fishery has become a very important industry—the more important as it affords winter employment to a large number of

resident fishermen who would otherwise spend their time in an idle or unprofitable manner. The proceeds of the industry are upwards of $50,000, the fish being dressed and shipped to United States markets."

It is doubtful if the sturgeon has, in any numbers, ever frequented the northerly rivers of the Province, and it is on the Fraser river alone that any fishery has been developed of much commercial value. They may be found in the river during most months of the year, but migrate from the sea to the fresh water, especially in the early spring about the middle of April, or even as early as February. The Indians formerly were accustomed to take them by means of trawls with long lines and baited hooks. Gill-nets were licensed by the Dominion Government some years ago, and for three or four years there was quite a boom in sturgeon fishing. In fact, so remunerative did the fishing prove that a large body of fishermen immediately engaged in it with the result that in three years the catch fell to one-fifth of the amount taken a short time before.

At the present time not more than 30,000 to 40,000 pounds of sturgeon are taken annually—or about twice the amount of the total Columbia river catch. Vast numbers of small fish are seen by the Fraser river salmon fishermen and this leads to the belief that, with the enforcement of the present Dominion Regulations, the fishery will, in due time, be restored to its former state. This is greatly to be desired, since the industry is carried on after the close of the salmon fishing and good earnings can be made.

Pilchard and Anchovy

These two valuable species occur more or less abundantly in southern British Columbian waters. The first-named is caught along with the herring on the eastern and western shores of Vancouver island. It is also said to be very numerous in Barkley sound and adjacent inlets.

In its small, immature stages it is the "sardine" of France. Investigation on the Pacific Coast reveals the resorts of these fish, and shows that a canned sardine industry which could successfully compete with the greatly esteemed European article is possible.

That the true anchovy is a British Columbian fish has long been known; but the migrations of this valuable species are at present not ascertained. Once known, however, the British Columbian anchovy could be prepared as a paste to compete in markets which are at present supplied by the Mediterranean.

Smelt

There are two varieties of smelt common in the markets—the *Osmerus thaleichthys* and the *Hypomesus pretiosus*. They are both in brisk local demand.

Cod

There is practically no true-cod industry in the Province, though the other species of this genus abound. This may be due to the fact that the true-cod does not occur in sufficient quantities to justify large outlays on its exploitation. The shores and fishing-banks farther north in Alaska, however, yield it in abundance, bringing in large sums of money annually to those engaged in the industry.

As long ago as 1880, the attention of the Government was called to the presence of this food-fish and men who were inspecting and reporting on the resources of the British cod-banks became very confident that the Pacific cod-fish is the same as that caught in the Atlantic, and saw no reason why, in the course of time, and with care and attention, it should not become as valuable and important on this side of the continent as the Newfoundland fish in the East. The reason that this enterprise has so far not been extensively entered upon is probably due to lack of investigation.

Before the cod fishery can be developed in British Columbia, information is necessary and the Marine Biological Station will have no task more important than that of ascertaining where the true-cod abounds, the nature of its food, migration and spawning habits.

The Black-Cod or Skill

This delicious and much-sought-after fish abounds in the northern waters of the Province, especially along the western shores of the Queen Charlotte islands. It favours deep water, especially depths of from 70 to 90 fathoms, though it is also found at 20 to 250 fathoms. It is never caught in the surface waters and avoids shallows.

It is caught mostly in the winter months. The black cod is a delicious food-fish, of firm and flaky texture, being white in colour and rich in flavour. Owing to its rich oily nature, it is far more appetizing than the drier and firmer true-cod. On the table it bears a distinct resemblance to a large whiting—that is, the true European whiting—a fish wholly differing from the inferior so-called whiting of the western waters.

It is caught with very long lines, each carrying 120 to 150 hooks fixed on snoods at regular intervals. Great care has to be exercised in taking the fish off the hooks as it is very tender-mouthed.

Investigation is absolutely essential in the case of this species also. The determination of the spawning season, the nature and location of the spawn and fry are important factors in the framing of regulations to preserve and develop this industry.

Minor Varieties

A number of edible fishes abound along the rocky shores of the Province, which are used chiefly to supply the local markets. The cultus cod is the principal of these minor fish; it weighs

from four to ten pounds and is caught by means of baited hooks and by drag-seines. The red cod has more the features of a bass than a cod-fish, and in California is frequently called "sea-bass". Its weight ranges from three to twelve pounds. Several other bass-like fishes are largely sold; one species, generally styled the red rock cod being a most excellent table fish.

There are no soles in British Columbia, the fish that is sold as such being a species of flounder. The latter is, however, a very choice table fish. It is very small, seldom exceeding a pound or so in weight.

Lobsters

During the past few years, efforts have been made to establish the Atlantic lobster in Pacific Coast waters and several consignments have been sent and planted at various points.

As far as can be ascertained at present, and from the opinions expressed by those charged with the work, there seems little doubt that this valuable crustacean will thrive in its new surroundings, and that the nucleus of an additional branch of the British Columbia fishing industry has been formed with its introduction. Great difficulty, however, will attend the conclusive proof of these experiments for some time, the lobster being very migratory in its habits.

In June, 1905, lobsters to the number of 1,025, were shipped west from Halifax to Vancouver in charge of an official who was thoroughly conversant with the handling of live lobsters. These were safely deposited at various points, but what ultimately became of them is not as yet definitely known.

Once again, 1,620 lobsters were shipped, in the spring of 1908, to the west from Halifax with practically no loss. The officials looked after the planting of them with the utmost care, and in order that they might have some idea of how the lobsters would stand the introduction into new waters, large crates were put down and the lobsters deposited in these. After some weeks they were examined and the lobsters found to be in a perfectly healthy condition. They were then distributed at different places on the coast.

Oysters

Shipments of Eastern oysters have been made in the same way, and on re-examination some time after planting, they were found to be perfectly healthy and to have grown and prospered in their new surroundings. Plantings were made both in bays and inlets on the coast of the mainland and also around Vancouver island and there is every reason to believe that so far as growth and development are concerned, the cultivation of the Eastern oyster in the province of British Columbia is successful.

From the opinions of some of those engaged in this business, however, it would seem that the water on this coast is too cold for the oysters to propagate, since, in most cases, the long sandy stretches, to which they have been accustomed in Eastern waters and which are essential to the raising of the temperature for successful propagation, are lacking. Nevertheless, the business of planting the young oyster and marketing the fully developed product is found by those engaged in it to be very profitable. The same difficulty with regard to the propagation of the lobster may be found to exist, but this has yet to be fully determined.

A profitable business is carried on in the cultivation of the native oyster which is smaller than, and inferior to, the Eastern variety

Crabs

Very fine crabs are to be obtained in large quantities along the coast of the Province, and there is a brisk local demand for them. This industry is by no means exploited to the full, however, as the Indians, by whom the bulk of the crab-fishing is done, are occupied with the salmon fishing throughout the summer and fall.

The demand for crabs in the local markets far exceeds the supply and this, despite the fact that they are to be found in such abundance. Saanich arm and the Lagoon at Esquimalt are teeming with crabs and often, in the summer, pleasure parties go out for the express purpose of catching them. A hundred or so thus taken in an afternoon is no uncommon thing.

Some idea can thus be obtained of the numbers that are to be caught by practical fishermen when novices are able, for the pure pleasure attached to the capture, to take them in such numbers.

Prawns

As in the case of crabs, very little attention is given to the systematic capture of prawns, in spite of the constant local demand for them. All that are offered by fish dealers are quickly bought up; for the prawns that are taken in provincial waters are of exceptional quality.

Most of the prawn fishing is done around Vancouver; very little is done off Vancouver island, though this is not because they do not exist there but simply because fishermen cannot be found to undertake their capture. Nearly all the prawns sold by the fish dealers in Victoria are either obtained from Vancouver or Seattle, and it is only occasionally that fishermen bring them in. When they do, their catch is readily taken off their hands by the local dealers.

Clams

Among the many fishery resources of the Province that are not appreciated at their real value is that of the clam industry. There is an unlimited market for these shell-fish in the United States, both in a canned and a fresh condition.

The existence of vast clam-shell beds at numerous points along the British Columbian coast—indeed, wherever Indian communities have established themselves—shows how much the native population relied upon this succulent food.

The clam supply in British Columbia is most remarkable; productive areas stocked with clams of various species occur practically at all points. There are several establishments for canning them, located at different points in the Province.

The fee for a clam fishing license is $2.00.

Abalone

It has long been known that the abalone occurs plentifully in certain areas off the British Columbian shores, especially along the coast of the Queen Charlotte islands. The soft animal contents are valuable for food while the shell itself is important for ornamental purposes, for making pearl buttons. The beautiful iridescent covering of the fish has been always in great demand, especially by German button makers, curiosity dealers and others.

These molluscs occur at a depth of from six or eight feet to considerable depths, and at the greater depths are taken by fishermen wearing diving suits and helmets. The abalone is in great demand in China for soups.

The following is a list of the more important species of *edible mollusca* found in British Columbia waters :

Ostrea lurida, Carpenter. . . . . Native oyster.
Pecten caurinus, Gould. . . . . Scallop.
Pecten hastatus, Sby . . . . . Scallop.
Pecten rubidus, Hinds. . . . . Scallop.
Mytilus californianus, Conrad. . . . . Mussel.
Mytilus edulis, Linné . . . . . Mussel.
Cardium corbis, Martyn . . . . . Cockle.
Saxidomus gigantous, Desh. . . . . Clam.
Macoma inquinata,. . . . . Clam.
Macoma nasuta, Conrad. . . . . Clam.
Rexithaerus secta, Conrad. . . . . Clam.
Siliqua patula, Dixon . . . . . Razor clam.
Tresus nuttalli, Conrad. . . . . Large clam.
Mya arenaria, Linné . . . . . Soft-shell clam.
Paphia staminea, Conrad. . . . . Hard-shell clam.
Panopaea generosa, Gould . . . . . .
Penitella penita, Conrad . . . . . .
Penitella ovoidea, Gould. . . . . .
Zirphaea Gabbi, Tryon. . . . . .
Purpuxa crispata, Chemn. . . . . Whelk.

Purpuxa lima, Martyn. . . . . .
Purpuxa Saxicola, Val . . . . . .
Littorina sitkana, Phil. . . . . .Periwinkle.
Littorina scutulate, Gould. . . . . .Periwinkle.
Acmaea personata, Esch. . . . . .
Acmaea patina, Esch.. . . . . .
Acmaea pelta, Esch. . . . . .
Acmaea mitra, Esch.. . . . . .
Haliotis Kamtschatkana, Jonas . . . . . .Abalone or Ear-shell.
Cehitons (*Cryptochiton*, *Katherina* and others)
Octopus punctatus, Gabb. . . . . .Cuttlefish

Whaling

Many species of whales occur off the coast of British Columbia. In fact sperm whales are occasionally captured, some of which have been gigantic specimens exceeding a hundred feet in length. In former years, the schools of whales were of no value to the Province but the action of the Dominion Government, by its encouragement of whale factories on modern principles, will create a large and remunerative industry all along the coast.

One of these Pacific whales will yield, on an average, 50 to 80 barrels of oil and 4½ to 5 tons of dried guano; and furnishes numerous other products when treated by the most recent mechanical and chemical methods, Oil fertilizer, leather, glue, canned "beef" (prepared whale-fish put up in beef cans) and even condensed milk from the female whale are among the products yielded by these monstrous creatures.

The companies operating make tremendous profits since, by the latest improved methods, it is possible to take the large and very numerous inferior whales that were formerly neglected; while the adoption of mechanical reduction processes secures the utilization not only of the blubber and whalebone, but also of the flesh, blood, massive viscera, etc., formerly cast away, to be devoured by voracious sharks, seals, and other such inhabitants of the deep.

Inland Lakes Fisheries

The Inland lakes of British Columbia, while being eminently suited to the production of food fish of many kinds, do not, at the present time, supply them in any large quantities, with the exception of trouts. For some time however, the Government has been considering the introduction of the true whitefish (*Coregonus clupeiformis*) of the Great lakes into this Province. The native whitefish exists in most of the British Columbia lakes, notably Atlin lake, but it seldom attains a weight exceeding two pounds, and is not as good a mercantile commodity as the whitefish that is indigenous to the Eastern lakes. There seems to be no reason, moreover, why the

latter fish should not thrive in the lakes of this Province, the most accessible waters for the planting of it being the Kootenay, Okanagan, Shuswap and Harrison lakes. The whitefish has prospered wonderfully in lake Manitoba and its introduction should be attended with like success in British Columbia.

If experiments in this direction prove to be successful, the commencement of a large industry will have been made, since not only will there be a great market in British Columbia, but also in the North West.

Injurious Fishes

The principal natural causes of destruction to the fish of the Province, and the salmon in particular, are the dogfish and the hair-seal. Both of these pests exist in great numbers, the seals crowding the estuaries of the rivers and causing tremendous havoc among the incoming salmon. In some years especially, the loss of fish due to the depredations of seals is very extensive. The danger attending the wholesale shooting of these marauders in the Fraser estuary, however, renders their extermination extremely difficult, but it is to be hoped that some scheme may be devised that may prove effective in this direction.

The dogfish, too, are responsible for a large amount of destruction among the fish, and, unfortunately, there has so far been no systematic effort made to lessen the destructive depredations of this voracious outlaw. Establishments such as exist on the Atlantic, for the reduction of dogfish, are urgently needed.

Other causes of destruction among fish, such as the dumping of mill refuse into streams and lakes, are being overcome as constant supervision is exercised by Government officials, the offenders being dealt with accordingly.

The swarms of trout which follow up the spawning salmon are a source of great trouble to hatchery officials for they ravenously devour vast quantities of salmon eggs, thereby working great hovoc in the hatchery streams.

There are so many causes of destruction among the eggs and fry of salmon that everything possible should be done to lessen the destruction while such strenuous efforts are being made to preserve the salmon industry by means of hatcheries. The trout is a very useful and valuable fish in its proper place but its presence is by no means to be desired where salmon are spawning.

British Columbia Game Fish

SALMON—It seems to have been the general opinion in the past that the sport of salmon fishing in this country was not worth trying, but of late years it has been discovered that this is erroneous and people have been coming here from all over the world to fish. It may be true that the salmon generally will not rise to

the fly, but under certain conditions of the water, the small species called the coho has been known to rise freely, and there are several authentic cases of spring salmon having been caught in like manner.

However, even if the fish cannot be caught with the fly, there is no doubt that they will give good sport to those who like trolling. The coho, though ranging in weight only up to about ten pounds, is a most lively fish, and by the use of a rod and light tackle gives excellent sport before he is gaffed.

Campbell river has, at present, the name of being the best for game fishing, though there are many other places as good in the Province. The fishing there begins in July. At first, only the cohos are to be caught and they come in great numbers. About the end of July, however, the big tyee salmon appear; they average about 45 pounds and have been caught on a rod up to 72 pounds.

The best salmon fishing is obtained from January to April. At this time of the year, the spring salmon are to be caught and they are then in the pink of condition and afford excellent sport, though the catch may not be as large as it is possible to make later on in the year. The man who has time then to go to Port Simpson will be well rewarded.

Barkley sound also has good fishing; while within easy reach of Vancouver, good spring fishing can be had at Pender harbour and Sechelt.

During September and October the cohos run in great numbers in Vancouver and Victoria harbours and six or seven fish in an afternoon's fishing is quite a common occurrence. A few spring salmon are also caught at this time.

Trout

Attempts have been made to give a list of the lakes and streams of the Province to be recommended for fishing, but this is quite hopeless as it is difficult to discriminate. As with everything else, there are favourite localities, but in respect to trout alone, nearly every part of the Province has its attractions. On Vancouver island, one of the best trout streams that is easy of access is the Oyster river, a short distance north of Comox. The Campbell river stands out prominently also as a good trout stream. Closer to Victoria, Shawnigan lake and Cowichan river and lake afford excellent fishing. On the mainland, good fishing can be obtained at Frederic arm, while from Sechelt the streams at the head of the narrows and Salmon arm can be reached. Close to Vancouver, Capilano and Seymour creeks will still give a few splendid fish. The Squamish can also be reached in a short time from the same place. Going farther into the interior, Yale and Hope have good streams, and Sevonas, when the water is in condition, will furnish excellent sport. Taking the whole country into consideration, it is difficult to beat the Kootenay for trout since almost every stream there has good fishing and some of them contain enormous charr.

In northern waters, nearly all the streams have quantities of grayling, ranging from one to two pounds in weight. They rise readily to the fly, and, while hardly to be compared with the trout for sport, are well worth catching. Near Atlin the fishing is excellent, and at Taku, which is just across the lake from the town, a basket of fifty fish would not be considered any very large catch.

Cold Storage

There are several large cold-storage plants in operation in the Province which greatly facilitate the handling of salmon and halibut. Three of these establishments are situated on the Skeena river, being operated in conjunction with canneries. There are also two on the Fraser river, one of these—owned by the British Columbia Packers' Association—being an especially large, up-to-date and well-equipped establishment.

Revenue and Expenditure

The following shows the revenue and expenditure of the Government of British Columbia in respect of fisheries for the year ending March 31st, 1910:

REVENUE

Licenses issued,—	
12 trap at $25	$ 300 00
75 cannery or fish-packing at $100	7,500 00
4,708 fishing at $5	23,540 00
Total revenue	$ 31,340 00

EXPENDITURE

Total expenditure	$21,728.03

THE GAME OF PRINCE EDWARD ISLAND

By E. T. Carbonell

Secretary of the Fish and Game Protection Association and Game Inspector of Prince Edward Island

Although there have been game laws on the statute books of Prince Edward Island for a great many years, no provision was ever made for their enforcement until the year 1906. In that year the conservation of game birds and game fish was entrusted to the members of the Game Association, which had been organized during the previous year for the object of assisting in the conservation of all game. The protection given to game by this association, being voluntary, has necessarily been very limited. Still, under the slight protection afforded, both the game birds and trout have wonderfully increased in numbers.

Considerable effort is being made to disseminate among the farming communities of Prince Edward Island, reliable information as to the great boon the partridge, curlew, plover, and sandpipers, etc., are to the agriculturist, by reason of their destroying those noxious insects which prey on the farmer's crops. It is only reasonable to expect that, as soon as the farmers realize what important factors these game birds are in the protection of their crops, they will give very valuable assistance to the efforts being made for the conservation of all such birds.

Experience during the last five years has demonstrated that, when the several species of migratory birds are not molested for a week or two after their arrival, they become so strongly attached to the feeding grounds which they select that it takes considerable hunting to cause them to abandon their chosen haunts. Under these circumstances, they remain for a longer period on the Island and their presence induces other flocks to alight which would otherwise have passed by to other resting places.

Partridge

The ruffed grouse, or partridge as it is commonly called, which was nearly extinct in the year 1905, has once more become fairly numerous. This valuable bird is esteemed both as an object of sport and as an article of food. The efforts put forth to increase the numbers of this species of bird would have been far more successful if it had not been for the greed of a few individuals who hunted it solely for market purposes. It certainly appears to be useless to expend time or money in attempting to conserve the partridge, unless means of curtailing the devastation caused by persons who hunt it for the profit they can make at it are adopted.

Curlew Three species of curlew visit the Province: The Sickle-bill, Hudsonian and Eskimo. The Hudsonian curlew are by far the most numerous, while the Eskimo, which were the most numerous from twenty to thirty years ago, have become almost extinct. The latter birds, being far from shy, were approached with ease, and, in consequence, were a ready prey for the market hunters. This was largely the cause of their extinction. The curlew arrives about the first week in July.

Plover The principal species of plover which visit this Province are the Golden, the Upland, Beetlehead, Ringneck, Killdeer and Piping plover. They are pretty fairly distributed throughout the Island. This bird is steadily increasing in numbers.

Sandpipers Fifteen different species of sandpipers are known to visit the Province. The best known are the Bartramian, the Spotted sandpiper, Least sandpiper, Semipalmated Sanderling, Yellow-legs, Greater Yellow-legs, and Solitary sandpiper. Some of these breed on the Island.

Woodcock The woodcock which come to Prince Edward Island are considerably smaller than their namesake in Great Britain. Since the disreputable custom of shooting them as they sit at the watering places at dusk has been prohibited, these birds have appeared to increase in numbers. The woodcock arrive in the early spring, and immediately turn their attention to building their nests and rearing their young.

Snipe The species of snipe which visit Prince Edward Island is known as the Wilson's snipe. Like the woodcock, they arrive early in the year, sometimes as early as March, and soon afterwards build their nests and rear their young.

Water Game Birds

Wild-Goose The Canada wild goose in its northern flight arrives at Prince Edward Island between the middle of February and the middle of March. From the time of their arrival until about the first week in May, when they leave for the far North, the bays and rivers of the Province are tenanted by vast numbers of these most valuable birds. On their southern flight, they reach the Province about the last week in August and remain about the bays and rivers as late in the fall as the climatic conditions permit. Since all spring shooting has been prohibited in many of the Atlantic States, they appear to have vastly increased in numbers.

Brant These beautiful and valuable birds are often very numerous along our coasts, harbours and larger rivers. Brant, in their migration northward, arrive in Charlottetown about the tenth of

April and remain until the tenth of June, when they resume their flight to the Arctic zone. In the fall, they arrive about the fifth of October and remain until the severity of the weather warns them to start for their winter quarters in the Carolinas. They appear to be exceedingly shy and will not approach the land as the wild geese do. They are becoming more numerous since spring shooting was prohibited in the Atlantic States.

Black Duck

The black duck is by far the largest, most numerous and most valuable of the ducks which breed on, or visit, the Island. They are well distributed throughout the Province and have greatly increased in numbers during the last five years, in consequence of the better protection they have been accorded. Experiment has demonstrated that they are easily attracted to, and retained in, any ponds or marshes, by simply sowing therein wild rice, which they eagerly devour.

Other Ducks

A great many species of the duck family visit the Province in their migrations. A number also breed on the Island. The chief species are as follows:

Goosander, Red-breasted Merganser, Mallard, Green-winged Teal, Blue-winged Teal, Pintail, American Scaup, Lesser Scaup, American Golden-eye, Barrow's Golden-eye, Bufflehead, Cockawie, Scoter, White-winged Scoter, and Sea Coot.

Rabbits

Owing to the long open season when so many of them are shot or snared and, also, on account of winters with which they have to contend, these animals have not increased in numbers. From present appearances, if something is not done to conserve them they will become extinct.

Open Seasons For Game

Partridge, from October 1st to November 30th. All wild ducks, from August 20th to December 31st. Woodcock and snipe, from September 1st to December 31st. Wild geese, from September 15th to May 10th. Brant, from October 1st to June 10th. Curlew and plover, from July 15th to December 31st. Rabbits, from September 1st to February 28th.

Licenses

Non-residents are required to take out a game license. The fee is fifteen dollars and the license is good for twelve months from date of issue. A guest license can be obtained for a fee of two dollars, and is good for one week. Sons and brothers of residents, may obtain a license good for one year for a fee of two dollars and a half. Any non-resident owning and paying taxes on property in the Province, of the value of not less than $325, will be granted a game license for a fee of five dollars. These licenses are good for twelve months.

GAME OF NOVA SCOTIA

By J. A. Knight

Chief Game Commissioner of Nova Scotia

The following is a summary account of the condition of the game resources of Nova Scotia, showing in what respects protection has been effective and also indicating where additional restrictive measures are needed:

Moose The number of moose reported killed in 1908 was 688, while in 1909 it was 405. The number of moose reported killed in 1910 was 464.

Probably about 100 should be added to the above figures for each year for moose not reported, including those illegally killed. The figures for 1908 include both cows and bulls. Beginning in 1909, cows are protected until 1912.

By reducing the length of the open season and by the enactment and enforcement of stricter regulations in other respects, the moose are better protected than they were up to three or four years ago. It is difficult to determine whether or not they are actually increasing in numbers. In some districts where there is an unusual number of skilful hunters who, in one way or another, manage to evade the law restricting the killing to one moose per man, they appear to be decreasing; on the other hand, there are districts where they are reported to be increasing. In the Province as a whole, they are, at least, probably holding their own.

It is too soon to speak positively of the effect of protecting the cows. The market is a great incentive to killing. To prohibit the sale of the meat even for a few years would, no doubt, produce very favourable results.

Caribou The caribou have almost disappeared from the greater part of the Province. There are still a few herds west of the strait of Canso, but they do not seem to increase in that part of the Province, notwithstanding a close season for eight or ten years. On the island of Cape Breton, however, in the northern portions of Inverness and Victoria counties, they are reported in considerable numbers and probably are not on the decrease there. The caribou are protected until 1912.

Red Deer

Up to about fifteen years ago, there were no red deer in Nova Scotia. Some were then imported and put out in different parts of the Province and a close season for a number of years provided. They have increased until they are now found in considerable numbers in almost all sections of the Province. The stock of deer has been increased in part, no doubt, by migrations from New Brunswick. The red deer are protected until 1912.

Hares

Hares do not seem to require much protection. At intervals of a few years they appear to decrease as the result of disease among them, but soon regain their usual numbers. There are no statistics of the number killed; but they are sold in the markets in large numbers in the open season.

Game Birds

Ruffed Grouse

There are no statistics of the numbers of game birds killed. The most valuable of these is the ruffed grouse. Owing to favourable weather conditions, as well as stricter regulations, the grouse have increased during the last few years. They were more numerous in the season of 1910 than at any time within fifteen years.

Woodcock and Snipe

Woodcock and snipe being migratory birds, not much can be done for their protection. Though reports vary from different districts, probably, on the whole, they are on the decrease.

Ducks and Geese

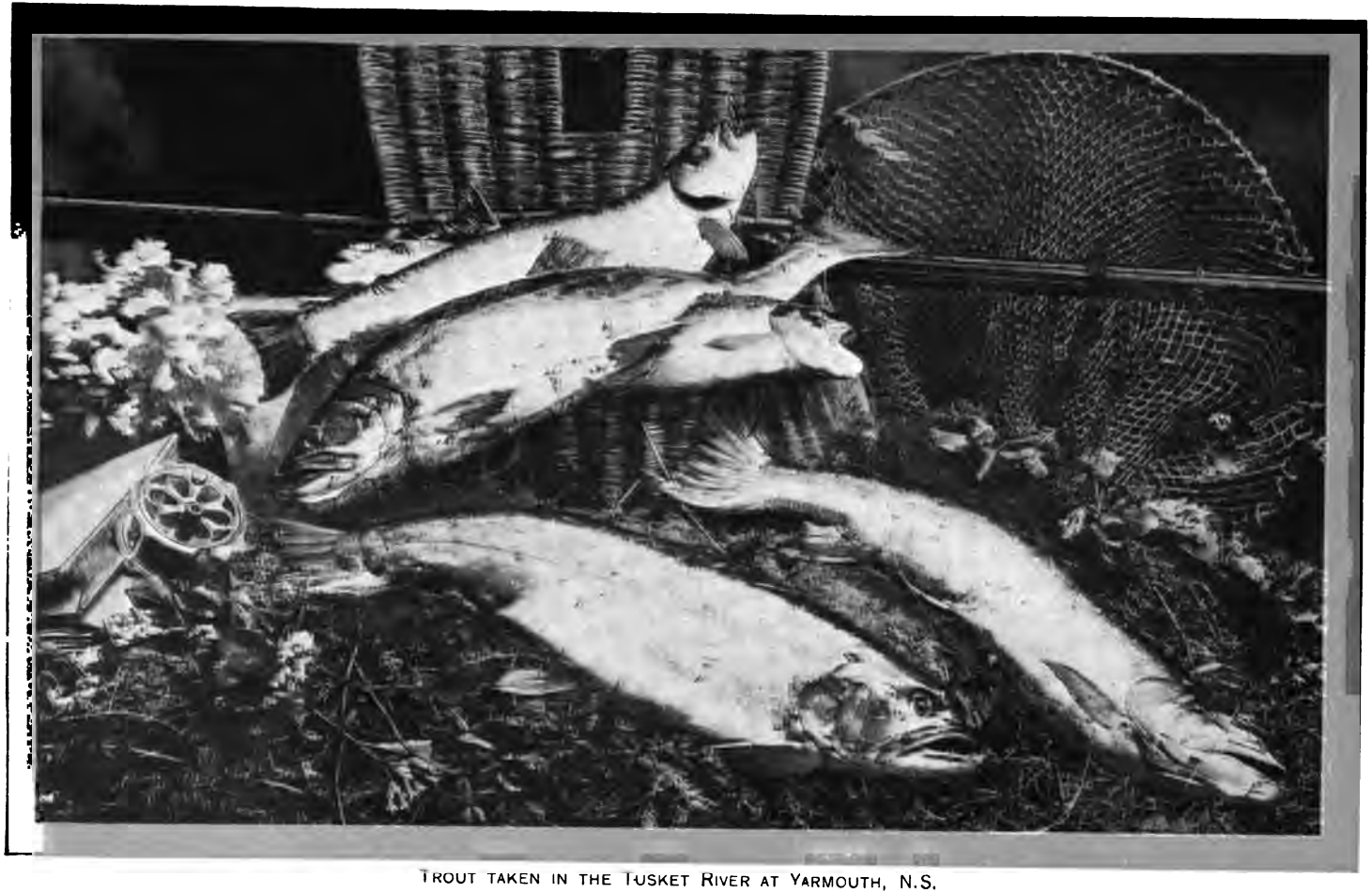
Blue-winged teal, sea ducks and wild geese, as well as the smaller shore birds, do not vary much from year to year. They appear to be about as numerous as at any time in recent years.

Small Birds

With the exception of the English sparrow, the small birds, and birds of song, are protected throughout the year. It is probable that they are on the decrease, though there is no reliable information on which to base an estimate of their relative numbers from year to year. The small boy with the gun is the greatest menace to bird life. The most effective measure of protection would be a general gun license.

Fur-bearing Animals

There has hitherto been no way of ascertaining the number of fur-bearing animals taken. By a recent amendment of the Game Act all packages of fur skins exported are required to be examined and the quantities of each kind certified. Statistics from this source are not yet available.



TROUT TAKEN IN THE TUSKET RIVER AT YARMOUTH, N.S.

Otter and Mink

There is little room for doubt that our most valuable fur-bearing animals such as otter and mink are decreasing in numbers from year to year. Some further measure of protection will soon become necessary.

Beaver and Marten

Beaver and marten are protected throughout the year. The beaver were almost extinct a few years ago, but are now re-appearing in small numbers in different parts of the Province.

Fox, Raccoon and Muskrat

Animals which have hitherto been considered to some extent pests, have now become so valuable for their fur that demands are made in some quarters for their protection. Among them are the fox, raccoon and muskrat. In the case of some of them, at least, it would be advisable to protect them during the season of the year when the fur is of little value.

Domestication

There are several fox farms in the Province which have met with some measure of success, but statistics regarding them are not at present available. Some effort has been made to breed mink in captivity. Results as yet are uncertain.

Pests

There are no wolves in Nova Scotia. The most destructive carnivorous animals are bears and wild-cats. In most of the counties, bounties are paid for their destruction. Wild-cats are to some extent hunted with dogs and are also caught in wire snares and steel straps. The bears are taken chiefly with steel traps.

GAME FISHERIES OF QUEBEC

By E. T. D. Chambers

Secretary-Treasurer of the North American Fish and Game Protective Association

The game and inland fish wealth of the province of Quebec is, after that of its forests, mines and water-powers, one of its most important natural assets. Nevertheless, the absence of any complete system of provincial statistics renders it difficult to arrive at its exact money value to the Province. There are some available figures, however, which facilitate an estimate. Thus in 1910, nearly eleven hundred non-resident anglers purchased licenses for fishing with rod and line in the Province. About two hundred of them were salmon fishermen, who paid $25 each for their licenses, whether fishing on the open salmon waters of the Province, or being lessees of government fishing rights, members of clubs holding such leases from the Province, or non-resident guests of clubs or of owners or lessees of salmon fishing rights. Nearly four hundred non-residents, not being lessees of provincial waters or members of incorporated clubs, paid $10 each for licenses to angle for other fish than salmon, while considerably more than five hundred non-resident anglers paid $5 each for licenses for similar fishing rights, the reduced cost of such licenses being due to the fact that the holders were lessees of Crown fishing rights or members of clubs. The total amount of government revenue from angling licenses was thus nearly $11,000, and leases of angling waters brought in $50,000 more.

This direct revenue from game fisheries is a very small fraction, however, of their actual money value to the Province. One American salmon fisherman told the writer that each of his fishing trips to the province of Quebec costs him over $4,000. Some salmon fishermen lease private waters, and when, in addition to what they pay for their fishing rights, they pay for their travelling expenses in Canada, their hotel bills, guides, canoes, camps and equipments, supplies, etc., $500 each is a reasonable estimate, and often it amounts to many times that sum. At least two hundred non-resident salmon fishermen must have angled in Quebec waters last year, representing a total expenditure of $100,000. At least a thousand non-resident anglers fish in the province of Quebec for ouananiche, trout, bass, muskallunge, and other fish, and it is well within the mark to place their average expenditure in the province at $100 each. This adds $100,000 to the money value of Quebec's inland game fisheries, making a total of $200,000.

There are, however, indications of depletion. A former Minister of Colonization, Mines and Fisheries declared in the Provincial Assembly in 1906, "that for forty miles around Montreal the game has almost completely disappeared, and that our rivers and streams do not offer more than a quarter of the fish which we were able to take ten years ago," and further "that the fishing has diminished in a surprising manner in lake St. Peter, lake St. Louis, lake St. Francis and the lake of Two Mountains, as well as in the upper part of the St. Lawrence, in the Ottawa, the river Jesus and the river des Prairies." There is now only one of the many tributaries of the St. Lawrence in either Ontario or Quebec, west of the city of Quebec, that a salmon ever ascends. At one time in these tributaries, salmon were netted and speared in great numbers.

Notwithstanding the depletion which has occurred in some of Quebec's inland waters bordering on the great centres of population, the fact remains that the Province still possesses some of the richest and most varied game fisheries on this continent.

Salmon Rivers

Quebec's salmon rivers may be grouped in two divisions; those on the north shore of the river and gulf of St. Lawrence from the Saguenay to Labrador, and those of the Gaspe peninsula.

On the North Shore there is scarcely any salmon fishing worthy of the name west of the Saguenay, though in former times almost every important tributary of the St. Lawrence as far west as lake Ontario was a salmon river. A few salmon still ascend the Murray river, which flows into the St. Lawrence at Murray bay, and until a few years ago, when mill refuse polluted the stream, some were annually taken in the Grand river, a few miles below Ste. Anne de Beaupré. The ascent of the Jacques Cartier river, some thirty miles west of Quebec, is still effected by a few fish, and, if the Dominion regulations concerning the location and the mesh of salmon nets were properly enforced in the St. Lawrence, there is every reason to believe that so clean a stream as the Jacques Cartier would, in the course of a few years, become once more an excellent salmon river. The Grand river of Ste. Anne and other streams both east and west of Quebec could undoubtedly be re-stocked with advantage and success, provided the pollution of the water ceased, the fish were protected and proper fishways were constructed in all dams below the natural spawning grounds of the salmon.

The salmon rivers flowing into the Saguenay, and the best of the accessible streams emptying themselves into the St. Lawrence and Gulf from the Saguenay to the eastern limit of the Province are leased to private individuals and clubs, and these are all carefully preserved by the guardians of the lessees from the time that the fish commence to run into them early

in the spring, until after the close of the spawning season. The principal tributaries of the Saguenay are the Mars, the Eternity, the Shipshaw, the Chicoutimi and the Ste. Marguerite. The Eternity is a small and comparatively unimportant stream, though a certain number of salmon spawn in it every season. The Ste. Marguerite is the largest of the Saguenay rivers and quite a noted one for salmon. The salmon which are netted by the fishery officers of the Dominion near the mouth of the Saguenay, for supplying spawn to the Tadoussac hatchery are chiefly fish which are attempting the passage of the Saguenay to the Ste. Marguerite. These parent fish are of course liberated after being "stripped" at the end of the season. Complaints are made of the difficulty of protecting the Saguenay salmon from illegal capture by nets and spears, and it is evident that more efficient protection is required.

Eastward from the mouth of the Saguenay, one passes in succession the estuaries of a number of streams, including the Grand Bergeronnes, Petite Bergeronnes, Escoumains, Portneuf and Sault-au-Cochon, some of which formerly contained salmon. The Escoumains was, at one time, a good salmon river; but has been ruined by a dam built upon it and by the refuse from a mill. An old fisherman named Moreau claims that, in former years, he used to net seventy-five barrels of salmon a year in the river. Dr. Adamson and Colonel Alexander have written of the splendid sport which this river afforded fifty and more years ago. Some of the other rivers above referred to, such, for example, as the Sault-au-Cochon and the Manitou, contain no salmon because of natural obstructions where they empty into the sea. On others where there are a few miles, more or less, between the tide-way and these obstructions, natural or artificial, salmon are generally found. Belonging to this class are several rivers, some of them streams with good sized tributaries, notably the Outarde, the Manikuagan, the Pentecost and the Ste. Marguerite of the North Shore. The fact that salmon have been seen below the falls of all these rivers is satisfactory proof that, if they had the opportunity, they would ascend them. The beds of the upper portions of these rivers offer an immense area of undisturbed spawning grounds, and, considering that none of their lower falls are of exceptional height, there seems to be a loud call for the erection of suitable fishways to afford the fish an opportunity of going up higher. In Norway, where the conditions of the rivers are very similar to those of our own North Shore, fish ladders have been built at a moderate outlay on falls over fifty feet high.

Mr. Napoleon Comeau of Godbout, a reliable authority, has cited illustrations to show how a number of the smaller rivers on that coast could be improved and turned into good salmon streams, mainly by purchasing and then abolishing the netting privileges in the vicinity of their estuaries, and by a judicious planting of young fish.

Few rivers on the coast can compare with the Bersimis for salmon, either as to number or size. In 1860, the tract of country surrounding its lower waters was granted to the Montagnais Indians as a reserve, and these latter claim to be under no restrictions of anv kind as to the fishing of the river. The Indians prefer the spear to any other method of taking the fish, though some are also secured in nets. During the first years of the reserve it was not uncommon for one canoe to bring in forty to fifty salmon as the result of a night's spearing. As the result of this destructive fishing, the production of the Bersimis salmon has fallen from an annual yield of about eighty thousand pounds to twenty thousand, the total value of which, to the Indians, for food and for sale at Bersimis, is estimated at one thousand dollars a year. Mr. Comeau, already quoted, claims that the supply of fish could be not only maintained but increased, and the river made to yield for the Indians double its present revenue, if the Indian Department would consent to a change of conditions to which Mr. Comeau declares the Indians are ready to agree. I quote on this from his *Life and Sport on the North Shore*, at page 365, as follows:

> "There are some fine tributaries and two nice pools on the river that would rent for far more than the value of the fish that the Indians get out of the river. The Indians would consent to such an arrangement provided, of course, that the rental went to them, for I have made personal enquiries of them."

The Indian Department claims no jurisdiction, however, over the fishing, and the Government of the Province has recently leased it to Mr. Boswell of Quebec, who will not interfere with the fishing of the forty-eight Indian families on the reserve, so long as they confine themselves to fishing for their own food.

Of the many remaining salmon rivers on the North Shore, there are some, such as the Moisie and the St. John, that are very rich. Others, including the Godbout and the Trinity, though of smaller size, have been so carefully preserved that they are literally alive with fish during the open season. On one occasion 57 fish were caught in one day by a single rod on the Godbout, and three of the party, which fished the same river in 1908, had each over a hundred fish to his credit.

The Moisie is well known for its large salmon. It has yielded some over forty pounds in weight, many, every season, over thirty pounds, and the entire catch usually shows an average of over eighteen pounds. Mr. Ivers W. Adams, the owner of the riparian rights, has purchased other claims to the fishing which were the property of the Provincial Government, including the bed of the river itself. The net fishery at the mouth of the Moisie is so important that the lessee pays $6,300 a year for it to the Provincial Government and, notwithstanding the enormous quantity of fish taken in the nets, the due observance of the federal fishery regulations effectually prevents any apparent diminution in the supply.

The same firm that leases the net fishing in the estuary of the Moisie, pays $700 a year for that of the Nataskwuan. This latter is a stream with many picturesque falls, all of which are acsended by the fish as far as their spawning grounds, without any artificial aid in the shape of ladders. The Labrador Fishing Club, composed chiefly of New England sportsmen, pays $650 a year for the lease of the river. Though the season is somewhat short on this and other North Shore streams, because of the rapid fall of the water when the hot weather sets in, the fish are extremely abundant, and for a few weeks at least, the sport is excellent.

Mr. James J. Hill pays the Province an annual rental of $3,300 for the St. John river of the North Shore, and visits it annually with a party of friends, usually taking over 500 salmon on the fly during his stay of fifteen to twenty-five days on the river. The salmon of the St. John are quite plentiful and are of good size.

One of the most easterly salmon rivers on the coast under lease from the Government is the Washikuti, for which Mr. Robert E. Plumb of Detroit pays the government $400 a year. It yields large fish in abundance.

East of the Washikuti are several rivers formerly noted for the abundance of their salmon, such for instance as the Eskimo, near Labrador, which at one time yielded over 50,000 fish annually, the St. Augustine, the Mekattina, the Etimamiou, the Coacoacho, the Kegashka and others, most of which are difficult of access to anglers, and just as difficult for the Government to protect. They are, consequently, at the mercy of the netters, and could apparently be best assured of protection by being offered for lease on terms favourable enough to attract occupation and guardianship by responsible anglers.

Sir Charles Ross pays the province $400 a year for the Olomanoshibo and its tributaries, while another salmon river worthy of note on the North Shore is the Watshishu, in which one angler in twenty-four days' fly-fishing, only a few years ago, killed 182 salmon weighing 1639 pounds.

Most of the North Shore salmon streams contain trout, and some of them ouananiche as well. The sea trout that ascend them to spawn are, in many instances, very large and very numerous, especially those of the Trinity, the Moisie and the Godbout.

Anticosti contains several short rivers, some of which, like the Jupiter, contain salmon, and all of which are carefully preserved by Mr. Menier, the proprietor of the island.

On the south shore of the St. Lawrence, the most westerly stream now containing salmon is the Rimouski, which is in private hands and carefully preserved. The same may be said of the protection accorded by its owners to the Bic, a neighbouring river. The Cap-Chat was for years so badly poached that but few salmon frequented it. Now, after a few years' lease and proper protection, it is yielding quite good sport.

The more important of the salmon rivers flowing north into the lower St. Lawrence are the Matane and the Ste. Anne-des-Monts. Both contain very large fish and the Ste. Anne is leased for nearly $2,000 a year. The Magdalen is another good Gaspe river, controlled by Mr. Frank Ross.

The Dartmouth, the York and the St. John of the South Shore all fall into Gaspe basin, and are leased from the Province for $900, $750 and $1,020 respectively, per annum.

The Grand river offers surer sport than perhaps any other river in the country. Its lower waters, in which occur the best fishing pools, are entirely controlled by Mr. Louis Cabot of Boston, who owns the entire seigniory of Grand river. The upper waters of the river are leased by Mr. Cabot from the Province. The condition of this river is a splendid example of the benefits derived from proper conservation. The writer has counted upwards of 150 salmon in one pool.

Neighbouring streams to the Grand river are the Grand Pabos and Little Pabos, leased from the Government for $500 and $850 respectively, per annum.

The Port Daniel had at one time a good run of salmon, but has been almost destroyed by over-netting and spearing. It is now protected and will, it is hoped, attain its former importance as a salmon river.

Into Chaleur bay flow some of the choicest salmon waters of the continent. For the fishing rights of only a part of the far-famed Cascapedia, the government of the Province receives a rental of $12,000 a year. The salmon fishing in the Bonaventure brings in an annual rental of $2,250 to the Province, and, like the Cascapedia, it yields very heavy fish. A few of its pools are still in the hands of riparian owners.

It has been estimated that the salmon fishing of the Restigouche and its tributaries is worth from half a million to a million dollars. A great many riparian rights have been bought up by the Restigouche Salmon Club, which has laid out some hundreds of thousands of dollars on fishing and other proprietary rights on the river. Some individual salmon pools on the river have sold for as much as $30,000 each. For the fishing rights in three small sections of the Restigouche and its tributaries the provincial Government receives $950 a year. A small army of canoemen, guides, and wardens, finds employment every summer at good wages on the Restigouche, Cascapedia and other important South Shore rivers, and several guardians are maintained for protecting the fish as long as they remain in fresh water.

Sea-trout fishing is usually good in the bays off the mouths of salmon rivers in the early part of the salmon fishing season, and, later on, it can be had in the upper stretches of the rivers. The sea-trout is an eater of salmon spawn.

Other Fresh-Water Fish

The distribution of fish throughout the interior of northern Quebec has been largely facilitated by the apparent interlacing of the waters of the various river systems. Thus the headwaters of some of the feeders of the Ottawa, the Gatineau, the St. Maurice and the lake St. John or Saguenay system are only a few miles distant from each other, while other of the lake St. John waters are separated by only narrow divides from the headwaters of rivers flowing into James bay on the one hand, and into the lower St. Lawrence at Bersimis on the other. Sometimes there are small channels connecting different river systems across the low narrow divides above referred to, and at other times various species of birds, chiefly waterfowl, are doubtless responsible for the introduction of fish spawn—which adhere to their feet, legs or bills,—from the waters of one lake or stream to those of another.

In the far northern portion of the Province there is an abundance of fish wealth which is at present unavailable to anglers because of its practical inaccessibility. In the Rupert river the sea-trout and whitefish ascend from James bay to the foot of the lower falls, some miles from its mouth, in such abundance that the Indians and Hudson Bay Company's crews collect there from miles around to scoop out their winter supply of fish from among the rocks at the foot of the chute, by means of landing nets and bag nets.

Lake Mistassini, which is a hundred miles long and attains, in places, a width of some twelve to fifteen miles, contains in great abundance all the varieties of fish found in the inland Labrador peninsula waters, with the exception of the ouananiche and sturgeon. Not only are speckled trout and doré or pike-perch found here in very large numbers but grey trout (*Cristivomer namaycush*) often called lakers, as well as muskallunge and salmon trout, from five to fifty pounds weight are here in great quantities. The common pike, (*esox lucius*) and the whitefish are plentiful, and Mr. Henry O'Sullivan reports the existence there also of a fish locally called the *Maria*, which from his statement that it as closely resembles the cod-fish as the ouananiche does the salmon, is probably the ling or burbot, (*Lota Americana* or *Lota maculosa*). In Ontario, this fish is known in various localities as ling, eel-pout, lake-lawyer, and fresh water cusk, and it is abundant in lake St. John and many other northern lakes. It is not in any sense of the word a game fish, but it feeds upon the game fishes when these latter seek the bottoms of the lakes.

Pike, pike-perch, lake-trout and whitefish are among the game fish of northern Quebec. The pike-perch in northern waters, even in the latitude of lake St. John is frequently caught with the fly.

Mr. Henry O'Sullivan, D.L.S., thus describes the *namaycush* or grey trout of lake Mistassini and other northern waters:

> "Such solid fish are the grey trout here that only one pound of salt is required to keep 47 pounds of fish in good condition for the whole year. In the waters of the St. Lawrence slope the *touladi* or large grey trout are generally soft and flabby as compared with the speckled trout, but in the Mistassini waters the large grey trout are considered far superior to the brook trout, Our grey trout have whitish flesh, while their's is a solid reddish flesh much resembling the sea-trout in colour and flavour."

Fish is the chief article of food of the Indians around the lake, and during the spawning season in the autumn, when the fish come into shallow water, large numbers are caught in nets and cleaned and smoked for the winter supply, though fresh fish are also caught in winter on hooks through holes in the ice. The Hudson's Bay Company's people also catch and salt a large quantity. The taking of the fish on their spawning grounds would be disastrous if it were done to any great extent, but the limited population that makes use of these fish—only a few score of families in all—can scarcely cause any appreciable diminution in the supply in a lake a hundred miles long. The taking of these fish is often necessary for the support of human life, for there are no longer any moose, caribou or deer in the locality, and small game such as rabbits and partridges are scarce.

Lake Wakonichi, less than twenty miles south of lake Mistassini, into which it empties its waters, is twenty miles long and from one to three miles wide. It is considered one of the best lakes on the northern slope for fishing. All kinds of fish found in Mistassini are also taken in Wakonichi, for there is no fall sufficiently high to prevent them from passing from one lake to the other. In lake Albanel, paralleling Mistassini to the east, the same fish are to be found.

Not far from lake Wakonichi is the dividing ridge between the Rupert River waters and those of the Nottaway. The chief difference between the fish of the two systems is that sturgeon abound in the Nottaway waters but that there are none in the Mistassini or Rupert waters. A short portage of about five miles from Wakonichi leads to one of the bays of lake Chibougamau. In Chibougamau and all the neighbouring waters, the principal fishes are lake trout, brook trout, whitefish and pickerel, with an occasional muskallunge. Sturgeon is found on the Obatgoomau river and its tributaries, but has not been found in the lakes immediately surrounding Chibougamau. The lake trout grow to a very large size in this last mentioned lake, are very plentiful and of excellent quality. Brook trout of large size are very abundant in Chibougamau. Frequently specimens of this fish are captured which weigh from four to six pounds. Whitefish of four to eight pounds and pike and pickerel from eight to ten pounds are abundant in all the lakes of this region.

Passing to the Nottaway system, mention should be made of lake Shabogama on Bell river. The pike in this lake are very plentiful and of good size. Whitefish, bass and pike-perch are the other principal fish. A little farther west and south of the National Transcontinental railway line is Seals Home lake, the headwaters of the Harricanaw. This lake is in the heart of a fine agricultural section which is likely to be settled in the near future. It is important therefore that the excellent food fishes which it contains should be carefully preserved.

The Nottaway river at lake Mattagami receives both the Bell and the Waswanipi waters. At the mouth of the Bell equally large fish are taken by hook and line, while on the Waswanipi, many large specimens are speared by the Indians. In Waswanipi lake, a large expansion of the river of that name, and in lake Mattagami the prinicipal fish taken are whitefish of large size and excellent flavour, sturgeon, pike and pickerel.

Crossing to the south from the basin of James bay over the height-of-land there is not very much difference in the character and the varieties of the fish inhabiting the lakes and rivers. In the maze of streams and lakes forming the headwaters of the Ottawa, the Gatineau and the St. Maurice, there is chiefly this distinction, that trout, which were scarcely observed at all in the Bell waters, and are almost entirely absent from the headwaters of the Ottawa in northern Pontiac, are found in the upper waters of the St. Maurice and the Gatineau. Bass, pike and pike-perch, whitefish and the coarser kinds of fish are found everywhere in these waters. In the larger rivers and lakes, such as Kakabonga and Grand lake Victoria, sturgeon also abound.

Grand lake Victoria is only a few miles from the height-of-land, and contains, like lake Expanse and the majority of the waters in that section of the country, whitefish, black bass, pike, sturgeon and pike-perch.

In the Gatineau waters, as already mentioned, there are trout in addition to the other varieties of fish mentioned above, and in many of them, they grow to a large size, both the speckled variety and also the big lake trout. Some of the whitefish taken there have been over thirteen pounds in weight. The country drained by the Gatineau is thickly dotted with bass and trout lakes. Thirty-one-mile lake, contains large black bass. There has been, in the past, a great deal of poaching in the most accessible of the Ottawa and Gatineau waters. In recent years, however, many of these waters have been leased to fish and game clubs, who, by means of proper protection, are rapidly improving them.

Passing down to the lower Ottawa, one accustomed to the sport found in its waters a few decades ago is compelled to note quite a falling off in the supply of the game fish of the region, due largely to the practice of illegal methods of fishing which are now pretty well suppressed.

Bass fishing may still be had in the neighbourhood of Vaudreuil, and very large muskallunge, as well as bass and wall-eyed pike, doré,—or pike-perch as they are indiscriminately called here—are taken every season in close proximity to Ste. Anne-de-Bellevue.

Excessive netting has had much to do with the diminution in recent years of the fish supply of lakes St. Francis and St. Louis in the St. Lawrence. In the vicinity of Valleyfield, however, at the dams and about the entrance of the Beauharnois canal, and even as far west as the provincial boundary, there is still good fishing for doré, pike, whitefish, perch and some bass.

Almost all the inland waters in this vicinity, as well as those within a radius of some thirty miles of the city of Montreal, could, by careful restocking and the adoption of extra precautions in the way of protection, be made many times more productive than they are.

East of the great river systems of the James Bay basin and of the Ottawa and Gatineau described above are the extensive territories drained by the St. Maurice and Saguenay systems. In the northern portion of the province traversed by the line of the National Transcontinental railway, especially in what is known as the St. Maurice country, the new road is opening up very large areas of the very best sporting districts. What is probably the best trout fishing in the Province is to be found here. Numerous lakes in which *Salvelinus fontinalis* grows to a large size are now easily accessible from La-Tuque and many other points farther north and west of the line of the railway. Too much precaution cannot be taken, not only on the construction works of the National Transcontinental railway, but also in all railway construction camps, to prevent the wanton destruction of fish and game.

The northern parts of Maskinonge and Champlain counties, as well as portions of St. Maurice, contain numbers of well-stocked trout waters. Many of these are admirably protected by prominent clubs to which they are leased, such as the Laurentian, the Mastigouche, the St. Bernard and others, and very large amounts of money are annually expended in the wild country where they have their headquarters. Mr. W. H. Parker, manager of the Laurentian club, is authority for the statement that the expenditure of the club last year (1910), was $49,743, including $10,420 to one hundred and forty-five guides and thirty-five servants, who were employed during the fishing season.

What may be termed a model fish and game preserve is the establishment of Mr. Charles H. Simpson, of New York, at St. Alexis-des-Monts in northern Maskinonge. Here, Mr. Simpson has laid out an estate in the backwoods, in the heart of a beautiful fish and game country. Good roads have been built in all directions, a fish hatchery has been constructed for supplying fish of various kinds to neighbouring lakes, and large game and fur-bearing animals are carefully protected, until they have not only

largely increased on Mr. Simpson's own estate, but have overflowed into much of the surrounding territory.

The basin of the Saguenay is the home of the ouananiche—the great game fish of the inland waters of north-eastern Quebec. It is worthy of note that this fish is entirely absent from the waters of the Hudson bay, the James bay and the Ottawa systems. Its geographical distribution is quite general, however, throughout the northern and eastern portions of Ungava peninsula. Mr. Low found it in the Koksoak river for a distance of nearly two hundred miles below lake Kaniapiskau. It has been taken in the great lake Mishikamau at the head of the Northwest river which empties into lake Melville, and also in both branches of the Hamilton above the Great falls. In many of the salmon rivers flowing into the gulf of St. Lawrence, it has also been found, and especially in the Goynish, the Watshishu and Piashti rivers, as well—according to the statement of one of Mr. Low's guides—as in the headwaters of the Romaine and the Natashkwuan.

Ouananiche are found in all the tributaries of lake St. John. In lake Manouan, at the head of one of the branches of the Peribonka river, situated two degrees north of lake St. John and in the same latitude as the southern part of lake Mistassini, this fish is plentiful, as well as speckled and grey trout, pike and pickerel and whitefish of large size. The same species of fish are common to the Ashuapmuchuan, the Mistassini, the Mistassibi, the lower waters of the Metabetchouan and other tributaries of lake St. John. For some years, considerable netting was permitted in lake St. John, but this has been largely prevented in recent years.

In nearly all the lakes of northern Quebec, which the ouananiche inhabit, both speckled and grey trout and whitefish are usually found. One catch of a small net above the Great falls of the Hamilton river produced five different species of fish,—red sucking carp (*Cyprinus Forsterianus*), common whitefish (*Coregonus clupeiformis*), great lake trout (*Salvelinus namaycush*), brook trout (*Salvelinus fontinalis*) and pike (*Esox lucius*). Ouananiche have already been mentioned as inhabiting the Hamilton. In the same river above the Great falls, says Mr. Low in a letter to the writer, "there is the finest trout fishing in Canada, all large fish, none under three pounds, and plenty of them in all the rapids. Below the falls the fish are plentiful but small."

Ouananiche are exceedingly plentiful in the Grand discharge of lake St. John in the months of June and July, and here, and at the foot of the various cascades in the large northern rivers emptying into the lake, may be had the finest fly-fishing for ouananiche.

Speckled trout fishing is better in the smaller tributaries of lake St. John, such as the Ouiatchuan, the Ouiatchuanish and the Metabetchuan. Then too, in the smaller streams and lakes that empty into the large tributaries of the lake, such as Little Peribonka, the Alex, the des Aigles

Rat river, lake Epipham, lake Alex, lac des Aigles, lake Tshitagama, speckled trout are plentiful. The entire territory between lake St. John and the city of Quebec is intersected by lakes and watercourses containing trout, and so excellent is the sport furnished by these waters that they are nearly all leased to private individuals and clubs. Some of these clubs, such as the Triton, the Tourilli, the Metabetchouan, the Stadacona, the Laurentides, the Amabalish, the Iroquois, the Jacques Cartier and others, have erected club houses and series of camps on the territories leased by them. These territories often contain scores of lakes.

Lake Edward, famous for its very large speckled trout, which run up to seven pounds in weight, is the largest body of water between Quebec and lake St. John, being some twenty miles in length. The fishing is leased to the owner of the hotel.

In the immediate vicinity of Quebec are two or three beautiful trout lakes, which have been nearly ruined by excessive fishing. Lake Beauport is fished all the season through by market fishermen who claim to be within the law requiring fishing by rod and line only, but who use not only a rod and line, but perhaps half a dozen or more of them to one man in a boat.

Occupying much of the space between Quebec, lake St. John, the line of the Lake St. John railway and the Saguenay river is the Laurentides National Park, which was established in 1895 by the Legislature of the Province for the preservation of fish and game, the maintenance of an even water supply and the encouragement of the study and culture of forest trees. The park has an area of over 2,500 square miles, and encloses the headwaters of a number of important rivers, which have been stocked naturally with large and beautiful trout. Thus the Grand lake Jacques-Cartier, has furnished some specimens of *fontinalis* exceeding nine pounds in weight. Abundance of smaller fish are caught in the lower waters of the Jacques-Cartier, the Montmorency, the Murray, the Ste. Anne, the Batiscan, the Metabetchuan, and some of the other rivers that have their rise in the elevated tableland in the centre of the park afford excellent trout fishing. Nothing but fly-fishing is permitted in the waters of the park.

In the centre of the Gaspe peninsula, a preserve enclosing the headwaters of most of the important salmon rivers of Gaspe and Bonaventure, has been segregated. It is about the same size as the Laurentides, and is known as "Gaspesian Forest Fish and Game Preserve."

On the south shore of the St. Lawrence there is some fishing to be had along the whole length of the Richelieu from lake Champlain to Sorel, but it does not compare favourably with what it was several years ago. Excessive netting and the use of smaller meshes in nets than should be allowed are largely responsible for this depletion. The same cause has

led to the wholesale reduction in the supply of both game and food fishes in the St. Lawrence. The same thing as regards the taking of immature specimens by the market fishermen of the St. Lawrence, is true of the wall-eye pike or pike-perch (doré), of the whitefish and of the striped bass. Black bass are occasionally taken, and, more frequently, perch wall-eyed pike, ordinary pike and chub at various localities in the Richelieu, the most favourable for fishing being in the vicinity of Lacolle, in Chambly basin, at Beloeil and at Sorel.

Brome lake at Knowlton, has long been famous for its black bass, some of which exceed four and even five pounds in weight. Trout fishing was formerly good here but the trout have apparently fallen victims to the large pike which now infest the lake. Complaints are also made of winter fishing through the ice, which should most decidedly be stopped.

In lake Memphremagog, which is thirty miles long, and situated partly in the counties of Brome and Stanstead and, partly, in Vermont, an abundance of lake trout thrive, as well as pickerel and whitefish. Trolling affords good sport. The river Magog carries the water of this lake into the St. Francis at Sherbrooke, and offers fair trout fishing. The river St. Francis was formerly ascended by salmon, but the erection of dams without suitable fish ladders, the pollution of the water by mill refuse and the illegal killing of the fish, have long since accomplished their deadly work. Lake Louisa, lake Aylmer and lake St. Francis are among the lake expansions of the St. Francis river, and all contain maskallunge, sturgeon, bass, pickerel and whitefish, but no trout of any account.

Lake Megantic, about 73 miles south-east of Sherbrooke, abounds in lake and speckled trout and bass. Fishing here, as in most large bodies of water, is variable, and sometimes heavy bags are taken by trolling, the lakers occasionally scaling up to 25 pounds each. In the bays and inlets speckled trout rise freely to the fly, and every stream flowing into the lake is plentifully stocked with them, many being of large size. The best of these tributaries are Lower Spider and Arnold rivers, also the Annance, Victoria and Sandy rivers.

All through the back portions of the counties of L'Islet and Kamouraska, which are traversed by the line of the National Transcontinental railway, there are magnificent trout lakes, some of which are leased by the Lake Ste. Anne Fish and Game Club.

Lake Temiscouata and the surrounding waters, as well as the many rivers and lakes of the Squattecks afford some of the best trout fishing to be had in America. Lake Temiscouata is 28 miles long, and in some places over two miles wide. The water is very deep along the eastern shore, and the lake trout inhabiting it attain a weight of thirty to forty pounds. In the shallower parts of the lake and in the neighbouring streams brook trout are taken up to seven pounds each. The Touladi river and lake also contain very large brook trout, the river being one of the chief

tributaries of lake Temiscouata. The Squatteck territory, including its lakes, which are easily reached by way of the Touladi river, is leased to the Squatteck Fish and Game Club, an association of sportsmen from Philadelphia, who have gone very thoroughly and very systematically into the work of protecting the territory leased by them, as well as much of the surrounding country. One great difficulty with which these gentlemen have to contend is the impossibility of punishing poachers from the neighbouring province of New Brunswick. These poachers cross the interprovincial boundary, slaughter fish or game on the Squatteck territory, going back again before their arrest can be effected. It is, at present, impossible to follow and arrest them on a warrant issued in another province for violations of provincial fish and game laws. New Brunswick, itself, complains of a similar condition of affairs on its own borders, and it is sincerely to be desired that some method may be speedily devised of solving the difficulty.

In the interior of the county of Rimouski are to be found a large number of well-stocked speckled trout lakes, especially in rear of Bic and Rimouski. The lakes and rivers of the Neigette system are leased to the Neigette Fishing Club, and there are splendid lakes in Chenier township behind St. Fabien which are preserved by another club and which contain *Salvelinus fontinalis* of so brilliant a colouring that the honour of a distinct variety has been claimed for them. The writer has compared some specimens of these fish with others from the waters of Mr. Charles H. Simpson in Maskinonge county, and with Professor Samuel Garman's description of the Lac de Marbre trout. This comparison proved them to be identical in every respect with the fish which Garman has designated as *Salvelinus Marstonii*. In the same section of country there are many unleased lakes in which the fishing is free, several of which can be reached from Humqui and Causapscal stations on the Intercolonial railway.

Laws and Regulations

The laws regulating the close seasons for fish of all kinds, and also the methods by which they may be taken in the open seasons are those of the Dominion of Canada.

The provincial fishing laws provide that line fishing only, (rod and line) is permitted in the waters of lakes and non-navigable rivers, unless by special authorization of the Minister.

Residents of the province do not require licenses to angle in the waters of the lakes and rivers which are the property of the Crown and not under lease. The non-resident license for salmon fishing costs $25. For any other kind of fishing the non-resident license costs ten dollars, unless to members of clubs leasing fishing rights from the government, or private lessees of such rights, who pay only five.

Individual sportsmen, whether resident or non-resident in the Province, and fish and game clubs incorporated in the Province may lease fishing rights from the Department. Leases are now usually made for five years, and cannot be for more than nine, except by order in council. Lessees are required to engage qualified guardians to protect properly the waters so leased from the Crown, under penalty of cancellation of the lease. Cancellation may also take place for failure to pay the annual rental when due, or for wasteful fishing, or for violation of the law. Holders of leases may prosecute trespassers. Lessees may sub-let their privileges with the consent of the Minister.

It may not be without interest to quote Mr. A. P. Low's description in a brief general way, of the fish and game of northern Labrador, (the section of country lying between the east coast of Hudson bay and the western shore of Ungava bay), even though the territory in question is beyond the present northern boundary of the province of Quebec.

"All the lakes and streams are abundantly stocked with fish, including large lake trout, brook trout, whitefish and suckers. Salmon are abundant in the rivers flowing into Ungava bay and young salmon were caught on the Stillwater river to within a few miles of Natuakami lake. A northern trout, probably Hearn's salmon, is very plentiful in the lower parts of the rivers and along the northern coasts from cape Jones to Ungava bay. This fish is not quite as fat and fine flavoured as the salmon, but has a good red colour, and may be found to answer well for canning. It is, as above mentioned, abundant, especially about Ungava bay, where it varies in weight from two pounds to fifteen pounds, and averages about five or six pounds. Barren ground caribou were found in large numbers along the route eastward from Clearwater lake to the Kenogami branch, while everywhere throughout the region the willow grouse or ptarmigan breeds in thousands. Other game is scarce."

GAME OF THE PROVINCE OF QUEBEC

By E. T. D. Chambers

Secretary-Treasurer of the North American Fish and Game Protective Association

The forests of Quebec contain some of the best game of the Continent, even after centuries of more or less reckless hunting. Moose and caribou abound in many localities, while the Virginian or red deer has increased to such an extent that in some parts of the Province it has become a nuisance. North of the provincial capital is the Lake St. John country, which has been attracting big game hunters from all parts of the world since the construction of the railway over a quarter of a century ago. The whole country from St. Raymond north to lake St. John and the Saguenay is full of game. A few clubs, including the Triton, which owns a large territory southeast of lake Edward, have leased the exclusive right to the hunting upon their limits; but by far the larger portion of the country is free to all comers so far as hunting is concerned. Riviere-à-Pierre station, 56 miles from Quebec is surrounded by a good moose country. So abundant are the moose that in one winter, some few years ago, nearly thirty of them were ruthlessly slaughtered for their hides, by the Indians. A better system of protection now prevails. Caribou are found in large numbers all over the territory to the north, as far as lake Edward, which is the centre of another excellent big game country. The large extent of country about the height-of-land between lake Edward and Kiskisink is over-run with game.

The Chicoutimi branch of the Quebec and Lake St. John railway passes in close proximity to a number of districts well stocked with large game. Caribou are quite numerous in the Lac-de-la-Belle-Rivière district. Chicoutimi is surrounded by another good hunting district, extending for a considerable distance upon both sides of the Saguenay river. Red deer, which for many years past had not been seen in the Lake St. John neighbourhood, have been quite plentiful since the winter of 1909–10. The prevailing impression is that the deer have been driven south by the wolves. All through the northern districts of the Province, wolves are reported to have been on the increase during the last few years, and 132 bounties of fifteen dollars each for the killing of wolves, were paid out by the provincial Government during the twelve months ended 30th June, 1910.

In the south-east corner of the Laurentides National park, just north of the St. Lawrence between Baie-St. Paul and the mouth of the Saguenay, is a large tract of country known as "Les Jardins", where caribou roam in

thousands. A small number of licenses, each giving the right to kill a couple of these animals, is issued annually and the species is increasing very rapidly.

Moose are plentiful in the forests along the St. Maurice river and the line of the National Transcontinental railway, west of the Lake St. John country. Many American hunting clubs have taken up territories under lease here.

As to the Ottawa district and its enormous back country, the Mattawa, Kipawa and Timiskaming regions, it may be said that moose, caribou and deer are all found there. Partridges, wild ducks and wild geese also abound in their seasons.

In the country north of the Ottawa, on both sides of the height-of-land between the waters of James bay and those of the St. Lawrence, there has been a decided diminution in recent years, in the number of moose, due no doubt to their slaughter by the many mining prospectors and men accompanying them. It is suggested that it be made a condition to the issue of prospecting licenses, that their holders must carefully observe all the laws and departmental regulations concerning the preservation of fish and game and the protection of the forests against fire. Bears are said to have increased in recent years both in northern Pontiac and also, on either side of the height-of-land.

All the country watered by the Dumoine and Magansibi and neighbouring rivers is full of large game, constituting a phenomenal hunting ground. In the Mattawa district, big game is not as plentiful as it once was, but there is more of it farther north, in and about the Kipawa country.

On the south side of the St. Lawrence red deer are plentiful in almost every part of the Eastern Townships, where any wild forest land remains, and also in the counties of Nicolet, Lotbinière, Beauce, Dorchester, Bellechasse, Montmagny, L'Islet, Kamouraska and parts of Temiscouata, as well as in the wilder portions of Compton and Megantic.

Almost the whole southern portion of the province of Quebec, adjacent to the state of Maine, is an unsettled wilderness, and is full of big game. Caribou are plentiful in the Lake Megantic region, and many moose as well as red deer, roam the forests of Beauce.

Moose are wonderfully plentiful in the Temiscouata country, as well as in Montmagny and Rimouski, and immense numbers of them roam undisturbed over thousands of square miles of virgin forest, in the heart of the Gaspe peninsula. Here they find a safe asylum in the Gaspesian Forest, Fish and Game Reserve, while thousands and thousands of caribou find a fairly secure retreat in the forests that line the shores of the Patapedia and the headwaters of the Matapedia in the interior of Rimouski and Matane.

Game Laws of Quebec

Hunting licenses yielded the province of Quebec last year well over $10,000, and leases of hunting territories amounted to some $20,000 more. In addition to such revenue, it is well known that the money spent by sportsmen every year amounts to a very considerable sum. It has been estimated that each of the 500 non-resident sportsmen who visited the Province in 1910 spent on an average $400. This would mean a total of $230,000 received by the people of Quebec in one year for their game resources.

The game laws of the Province provide that moose and deer can only be killed between the 1st September and the 31st December inclusive, the season for caribou being left open for another month, namely to the last day of January inclusive, except east and north of the Saguenay, where the open season for caribou lasts till the last day of February. The open season for all game birds commences on the 1st of September. The partridge season closes on the 15th December, that for woodcock, snipe, plover, curlew, tatler or sand-piper, and that for widgeon, teal or wild duck of any kind, on the 1st of March. The sale of partridge and the killing of beaver are prohibited at present. Hounding of moose and caribou is prohibited, and for red deer, the use of dogs in hunting is only permitted between the 20th October and 1st November of each year. No cow moose, and no fawn of moose, caribou or deer is permitted to be killed, and the law prohibits the killing or taking of moose or deer while yarding, or by what is known as crusting. Only one moose, two caribou and two red deer may be killed in one season by the same person.

There is no gun license required by residents in Quebec; but neither resident nor non-resident can have the carcass of any moose, caribou or red deer conveyed by a transportation company, unless it bears a tag, for which residents have to pay one dollar. The license allowing a non-resident to hunt big game, which license is accompanied by the necessary tags for transporting the carcasses that the law permits him to kill, costs $25 each for persons who are not members of a legally organized fish and game club, and ten dollars for persons who are already members of such a club.

Insectivorous birds are protected at all times. The use of jack-lights is prohibited, as is also the hunting of water-fowl of all kinds by means of vessels or yachts propelled by steam or other motive power.

Leases of hunting territories, not to exceed 200 square miles each, may be obtained by individuals or clubs at from three dollars per square mile up.

CHANGES IN THE GAME LAWS OF SASKATCHEWAN

By W. H. Van Valkenburg

Secretary-Treasurer of the Saskatchewan Game Protective Association

The Saskatchewan Legislative Assembly has recently amended the game ordinance in several important respects. The prohibition of Sunday shooting was made more emphatic by adding the words "and the carrying of a gun ready for use in the vicinity of game shall be *prima facie* evidence of hunting." Open season for prairie chicken has, owing to the rapid decrease in numbers of this favorite game bird, been reduced to the month of October. The close season for beaver has been extended to the year 1915, but power is given the Minister of Agriculture to permit the breaking of dams or the removal of beaver when they are found to be damaging property. The use of poison for the destruction of fur-bearing animals is forbidden, but this does not include wolves. The export of unprime skins is prohibited. A fee of $1, must now be paid for a permit to export a deer head and a like figure for each shipment of one dozen or less of ducks or geese, and no person may export in one season more than five dozen of such birds.

No permits may be granted for export of dead prairie chicken or other grouse.

A new schedule of licenses to shoot has been made as follows:

For residents of cities, towns and villages, bird license	$ 1
For all residents of Saskatchewan, big game license	2
For non-residents of Saskatchewan, big game license	50
For non-residents of Saskatchewan, bird license	25
For all residents of Saskatchewan, bird license	10

Provision for the issue of permits for guests has been repealed.

Taxidermists doing business in the Province must pay a license of $5 annually.

Penalties for contraventions of the game ordinance now range from a minimum of $10 to $300 and costs, according to the nature of the offence.

Persons away from home in close season are liable to be searched by game guardians if found carrying guns as if for use, and provision has been made for the issue of warrants for search of buildings.

The most important amendment to the game ordinance is the setting apart of the Dominion forest reserves known as the Beaver Hills, The Pines, the Moose Mountain, and the Porcupine reserves as game refuges where the carrying of guns, hunting and trapping at any time are forbidden. In this matter, the provincial authorities are co-operating with the Dominion Forestry Service.

THE GAME OF BRITISH COLUMBIA[a]

The greater portion of the area of British Columbia is still unsettled and game is found in abundance. Indeed, some of the unsettled portions of the Province are still unexplored, and consequently, game, in many places is as plentiful as it ever was. Some species, notably moose, are in greater numbers than they were twenty years ago. Even in the more settled districts careful preservation during the past few years has had a wonderful result, so that, even close to Vancouver, a city of over 100,000 inhabitants, deer and bear are frequently killed, while mountain goats still frequent the neighbouring mountains. There is no part of the Province where good sport of some kind cannot be obtained.

With the exception of antelope and musk ox, British Columbia has every species of big game that exists on this Continent; even the rarest of them being found in fair quantities. In addition there are wildfowl and game birds of various species, some native and others acclimatized, that furnish sport; while the waters afford the finest trout and salmon fishing in the world. In fact, the sporting possibilities are so many and so varied that it would be impossible to exhaust them in an ordinary lifetime.

During the past few years it has been the policy of the Government to preserve the game, and for this purpose a stringent game law has been enacted and is being rigidly enforced. Visitors are required to take out shooting and fishing licenses, and the number of head of game per gun is limited. It is therefore advisable that the intending hunter should before starting out obtain reliable information as to what he may, and may not, do.

Game Districts

Cassiar

This is, without doubt, the best game district in the Province; it is also the most inaccessible and expensive. The game comprises Stone's mountain sheep and caribou in numbers; moose are fairly plentiful and increasing in number; mountain goats are found in abundance; while black and grizzly bears, wolves and beaver are also in evidence. To get into this country one must start from Vancouver or Victoria not later than the end of the first week in August.

Mainland Coast and Vancouver Island

The principal game consists of wapiti on the island, and goat and bear up the big inlets on the Mainland. Black-tailed deer can be obtained almost anywhere, but those found up the inlets have better heads than those found elsewhere. Ducks, geese, snipe, willow grouse and blue grouse are extremely plentiful in many places.

[a] This article was kindly supplied by the Attorney General's Department of British Columbia.

Savona

This is on the main line of the Canadian Pacific railway, 225 miles from Vancouver and is a good place to go for blue grouse. Within a few miles, there is also splendid wild fowl shooting and a fair quantity of mule deer.

Bridge River and Chilcotin

These are favourite hunting grounds as the country is suitable for horses, the climate splendid, and the mountains not too thickly timbered. The game consists of the Ovis Montana or big-horn goat, grizzly and black bear, mule deer and caribou; the latter being plentiful in parts of Chilcotin. To get there one can go to Lytton on the Canadian Pacific railway and, from there by stage to Lillooet where guides and horses can be obtained. J. Russell, Deputy Game Warden for the Lillooet district, reports having counted, during a six days' trip in April of 1907, 844 head of deer and 242 head of sheep, making a total of 1,086 head of game. It must, however, be remembered that this was in the spring after an extremely hard winter, when the game had congregated on their winter range.

Okanagan

The northern portion of this district still has a good many caribou, and, in places, goat, deer and bear are easily obtained. On Okanagan lake there is still a small band of big-horn, a few deer and very good wild fowl and prairie chicken shooting.

East Kootenay

This district has the greatest variety of game of any in the Province. To the east of the Columbia river there are moose, wapiti (still under close season), big-horn sheep, mountain goat, mule deer, white-tailed deer, also both black and grizzly bear. To the west of the Columbia river caribou are to be found in fair numbers. Travelling is done almost entirely on horseback, and owing to the valleys being densely timbered, the trails have to be followed. Moose are now allowed to be shot, and in places are quite plentiful.

Big-horn sheep are found in fair numbers, but, owing to the fact that the big rams live on the rough broken mountains (in great contrast to the Lillooet and Northern sheep), hunting them is arduous work. It is a magnificent grizzly bear district, more especially in the spring.

West Kootenay

Nelson, a picturesque and thriving town, is a most attractive sporting centre. In close proximity to the town, some fine trout fishing can be obtained, and a short distance away the big land-locked steelhead, running in weight from ten to twenty-five pounds, gives splendid sport to those who care for trolling. Deer and bear may be obtained within a few minutes of town, and goat and caribou within a few days' travel.

Caribou

From Quesnel up to Fort George, on the Fraser river, game is not very plentiful, though close to the river a few bear and deer may be found and in some places a few miles away there are caribou.

However, some seventy miles up the river from Fort George the "Grand cañon" is reached, and from there a magnificent moose country extends as far as the Little Smoky river. From reliable reports received, it is probable that there are more moose to the square mile than in any other part of the Continent, and every year their numbers seem to increase. So far, the country has never been hunted except by a few prospectors. Whether the horns attain the large size of the Cassiar moose has yet to be determined, but some very fine heads have been seen. In this district, caribou are very plentiful on the higher plateaux, and in places both grizzly and black bear are numerous.

At the present time, all travelling would be done by canoe, and a great deal of the moose hunting in like manner. The lower levels are heavily timbered and hard to hunt in, but on the higher plateaux, there are big stretches of meadow and sparsely timbered country.

Kamloops

Kamloops is, at the present time, most famous for the splendid trout fishing that is to be obtained in its vicinity, Fish lake being especially favoured by one of the gamest trout in the Province. It is also well worthy of note as a big game centre, as mule deer are found in close proximity, while, by a longer journey to the Clearwater river, caribou and bear can be obtained. There is also, at times, fair wild fowl shooting in the neighbourhood.

Guides

It is absolutely necessary to have a guide, and a really good one at that. Anybody preparing for a hunting trip in this country is strongly advised to make an effort to secure the very best man that can be got, and not to hesitate to pay a good price for a good man. All the success met with will depend absolutely on the guide.

There is a large quantity of game in the country, but as the most highly prized, such as mountain sheep, moose, etc., have their favourite haunts, unless the guide is thoroughly up to his work, one might hunt for weeks and not see an animal, yet all the time be within easy distance of them.

Guides should be engaged some time beforehand, as the best men are always in demand. Indian guides are always to be had, and there are some very good men amongst them, but others are by no means reliable, and are easily offended by a man who does not know how to deal with

them. In Cassiar most of the guides are Indians, and it would be well for anybody going there to get the man who outfits him to engage a guide for him.

The best men generally have complete outfits and prefer to contract by the day or trip. They will supply everything except rifles and ammunition. This is really the cheapest way, since it saves the cost of tents, cooking outfit, etc., which are not likely to be used after the trip is over. The cost of contracting for a party would vary considerably, according to the district, number of the party, kind of game required and length of time out. Cassiar is the most expensive, unless an out-of-the-way trip is made, as horse-hire is $2 a day per animal, while wages and provisions are also high.

The following is a rough estimate of what it would cost for a six weeks' trip in Cassiar, from the time of leaving Telegraph creek till the return to the Coast: For one man, $1,300 to $1,400; for two men, about $1,200, each; for three men about $1,100 each. There should be a guide for each member of the party and also a camp cook.

In Lillooet and Chilcotin the cost would be a great deal less. For a party of two or three, the cost per man would be from $12.50 to $15.00 a day. In these districts pack-horses can be obtained for 50 cents a day and saddle-horses for 75 cents a day.

In Kootenay expenses will be higher, as horses are hard to get, and expensive.

The cost of a trip for hunting deer and goats on the coast, amounts to very little, as all travelling is done in boats, from which lengthy trips are not often necessary. Hunting wapiti on Vancouver island is not expensive.

Game and Fur-bearing Animals

Moose

Moose are very plentiful throughout the northern interior, but the biggest and best heads are obtained in the Cassiar district. In the neighbourhood of Atlin there is excellent hunting, and also near Telegraph creek, on the Stikine.

An excellent moose country can be easily reached from Fort George on the Fraser river, by a week's canoe trip. This district is not so pleasant to hunt in as the Cassiar country, owing to the amount of timber, but it probably has more moose to the square mile than any other part of the Continent. Twenty years ago moose were comparatively scarce in both the above named districts, but they have rapidly increased in numbers and every year better sport can be obtained.

In northeast Kootenay there have always been a few moose, but until recently they were so scarce that their existence was doubtful. For the past four years there has been a close season, but this year, owing to

the rapid increase, an open season was declared, though only one bull was allowed to each man. As trophies, they are not to be compared with the northern moose, but they compare favourably with those in the eastern part of Canada.

Wapiti At one time this magnificent animal existed in large numbers throughout the whole of the southern part of the Province; even where the city of Vancouver stands to-day old antlers are frequently picked up. Owing to a severe epidemic, followed by a hard winter, they were almost exterminated. Since then they have, in a great measure, been replaced by mule deer, which, during the reign of wapiti, were very scarce.

On Vancouver island there are still a good many left, and every year some fine heads are obtained. Anyone who can stand a rough trip in the dense forests can be reasonably sure of securing a good head. Owing, however, to a big decrease in numbers, it is highly probable that a close season will be declared after 1910. East Kootenay district also was not affected by the epidemic, but owing to wholesale slaughter by the Indians they were thought at one time to have disappeared. In 1905, a close season for wapiti was declared, and every effort made to protect them with the result that they increased to such an extent that a short open season will probably be allowed in 1911, when good sport will be a certainty. The East Kootenay wapiti is the equal of any on the Continent.

Caribou The mountain caribou is fairly plentiful in parts of the Selkirks, from the international boundary line to probably as far north as 54 degrees. In Chilcotin there are a good many, but probably the best grounds can be reached from Fort George or Quesnel. For those who cannot take such lengthy trips Revelstoke, on the Canadian Pacific main line, is within a day's journey of a fair caribou range; also from Mara, on the branch line to Vernon, and from Wilmer, on the Columbia river, caribou are to be obtained in a few day's journey. They are, however, not nearly so plentiful as in the two first named districts.

Osborn's caribou (*Rangifer Osborni*) is very easily found in the Cassiar district, where big bands are still frequently seen.

Deer Mule deer (*Odocoileus hemionus*) are more or less plentiful all through the southern part of the Province to the east of the Coast range. Lillooet, Chilcotin, and portions of East Kootenay are the best places to hunt them. They are not often seen north of 54 degrees, but seem to be gradually working farther north.

White-tailed deer (*Odocoileus virginianus*) are chiefly found in the bottom lands to the east of the Coast range, and south of the main line of

the Canadian Pacific. There are also some in the Babine range, and a few on the Fraser river, between Quesnel and Fort George. At one time fairly plentiful, they are now less numerous owing to the advance of settlement.

There are probably more in southeast Kootenay than anywhere else. They are also to be found in the Okanagan and Yale districts.

Columbian or coast deer (*Odocoileus columbianus*) are extremely numerous all along the coast and on Vancouver island, and, in fact, all along the islands except the Queen Charlotte group. They are not often found to the east of the Coast range. The best heads are obtained on the mainland.

Mountain Sheep

The big-horn mountain sheep (*Ovis Canadensis*) reaches its highest stage of development in the Rocky mountains. In southeast Kootenay it is still quite plentiful. It used to be found in considerable numbers in portions of the Gold range in the Okanagan and on the eastern slope of the Coast range, in the Ashnola mountains. In both these districts its numbers have been so decimated that protection has been afforded it for some years. In Ashnola district there has been a large increase, and an open season may be allowed in a year or two.

In the Lillooet district, also, on the eastern slope of the Coast range, there is a fine big sheep range. In this district, there is a beautiful open and generally rolling country and sheep-stalking is one of the finest sports.

While the Lillooet sheep are said to be the same as those in the Rockies, they, and also the Okanagan and Ashnola sheep, in a minor degree, differ in size and the shape of their horns. The horns have a much greater spread and finer points with smaller base measurements, almost similar to the Stone sheep; whereas the Rocky Mountain sheep's horns are more massive and compact. The latter have their habitat on more rugged mountains, and are often found on the same range as the mountain goat.

The *Ovis stonei*, a northern variety of sheep, is probably the most abundant of all and is very easily obtained in Cassiar. There is a fair sheep range a few miles from Telegraph creek, but the best ones are some little distance off. In this district there are still sheep ranges practically unhunted.

Saddle-back (*Ovis fannini*) are plentiful in the neighbourhood of Atlin.

Yukon sheep (*Ovis dalli*) are found in numbers from the south end of Teslin lake all through the country away to the Macmillan river.

The two above-mentioned sheep are closely related, and sometimes all three varieties are found in the same band. Their horns are not as massive as the common big-horn, but for spread and fine points cannot be excelled.

Goats

Mountain goat (*Oreamus montana*) are very numerous all over the Province, wherever there are high mountains. On the coast they exist in even greater numbers than in the interior. They can be found on the mountains close to Vancouver. At the head of Jervis inlet, or almost anywhere on Bute inlet, they can be seen from the sea with a good pair of field-glasses.

Bears

The grizzly bear (*Ursus horribilis*) is found all over the mainland, but not on Vancouver island. It is very plentiful in parts of the interior, especially in Lillooet, East Kootenay and Cariboo districts. It is also very plentiful in the northern portion of the Province.

The best time to hunt bear is in the spring, just as soon as the snow has gone off the old slides on the mountains, and a little remains on the timber. On the northern coast, bears come out between the middle and the end of April, according to the weather; in the interior, generally a week or ten days later.

The so-called black bear (*Ursus americanus*), which frequently varies in colour from a light brown to glossy black, is to be found everywhere. They are most plentiful on Vancouver island and the coast. When the salmon are running up the small streams they live almost entirely on these fish, and are easily found by watching the streams in the evening or the early morning.

Most of the specimens of white bear (*Ursus kermodei*) have come from Gribble island and that vicinity, but odd white bears (whether distinct specimens or merely freaks) have been obtained in many localities.

Wolves

The timber wolf (*Canis occidentalis*) is found more or less all over the Province, but is particularly numerous on Vancouver island and along the northern coast. They are large animals, probably the biggest of the wolf family, and vary greatly in colour from almost entire black to grizzly grey, and from brindled brown to yellow.

Coyote (*Canis latrans*) are more or less plentiful throughout the interior.

The Cat Family

Cougar, mountain lion, or panther (*Felis concolor*) is very plentiful on Vancouver island and some parts of the mainland; notably so in the Okanagan and Boundary district. They have been killed as far north as 54 degrees, but are not plentiful in that latitude.

Lynx (*Lynx canadensis*) may be found anywhere on the mainland, but is most numerous in the interior.

Wildcat (*Lynx faciatus*), is fairly common on the mainland in the vicinity of the coast. A few are to be found in the interior, even as far north as Yukon.

Foxes

Black fox, silver fox, cross fox, (*Vulpes decussata*), common fox, are found in the northern interior, the common fox being very numerous.

Other Fur-Bearing Animals

Beaver (*Castor fiber*).—Found everywhere in the Province, both on the mainland and the islands. They are not allowed to be taken.

Muskrat (*Fiber zibethicus*).—Found almost everywhere, but most numerous at the mouth of the Fraser river.

Sea otter (*Enhydris lutris*).—Very scarce. A few specimens are taken nearly every year by the Haida Indians in Hecate strait, and occasionally one or two on the west coast of Vancouver island and Queen Charlotte sound.

Land otter (*Lutra canadensis*).—Found more or less everywhere, but only in a few places in the north can they be considered as plentiful.

Raccoon (*Procyon lotor*).—There are quantities of these animals all along the coast and for some distance up the rivers.

Marten (*Mustela caurina*).—Found on both the mainland and the islands, but the best skins are obtained in the north.

Mink (*Lutreola vison*).—Most plentiful on the coast, but are found more or less throughout the Province.

Wolverine (*Gudo luscus*).—Principally confined to the mainland, but a few specimens are taken on Vancouver island.

Badger (*Tanidea americana*).—Found throughout the interior.

Porcupine (*Erithizon epixanthus*).—Found everywhere on the mainland.

Northern hare (*Lepus americanus*).—Extremely plentiful in the north and more or less so everywhere.

Jack rabbit (*Lepus texiamus*).—Not plentiful; have been taken in the Okanagan district.

Baird's hare (*Lepus bairdii*).—Not plentiful; have been taken in the Okanagan district.

Little chief hare (*Lagomys*).—Found on the mainland; plentiful in East Kootenay.

Polecat, little striped skunk (*Spilogala phenax latrions*).—Common on the mainland.

Skunk (*Mephitis spissigrada*).—Common on the mainland.

Weasel (*Putoris steatori*).—Found throughout the Province.

Fur seal (*Callorhinus ursinus*).—Occasionally taken in Hecate strait.

Hair seal (*Phoca vitulina*).—Very plentiful all along the coast and for some distance up the large rivers.

Sea lion (*Eumetopias stelleri*).—Fairly plentiful on the coast north of 51 degrees.

Wild Fowl

Ducks and Geese

At the right time and at the right place, magnificent shooting may be had, and there is no part of the Province where a few birds cannot be bagged during the season. Until the end of October the shooting is generally better in the country to the east of the Coast range, when the frost usually drives the birds down to the coast. In the upper country, about the choicest ground is some hundred miles or so up the Caribou road from Ashcroft. The Summer range near Savona, usually affords good sport, and good shooting can usually be had in any of the following places: Sicamous, Salmon Arm, Shuswap or Okanagan Landing. After October, one can get good shooting almost anywhere on the coast, provided one goes some little distance away from the settled districts. On the mainland, the head of Bute inlet is as good a place as any, but almost all the inlets furnish shooting. At Sechelt there is fair shooting. On Vancouver island there are numerous spots where good wild fowl shooting may be had; amongst them may be mentioned the Campbell and Salmon rivers.

Snipe

There is splendid snipe shooting every year, though some years are better than others. As many as thirty-seven and a half brace have been bagged by one gun in a short day's shooting. Bags of from fifteen to twenty brace are about the average for the best part of the season. These bags might be easily doubled, but hardly anybody will take sufficient cartridges to shoot much more than half a day. The best snipe grounds are close to Vancouver. There is also some fair snipe shooting within easy reach of Victoria.

Grouse

Prairie chicken (Columbia sharp-tailed grouse), are only found in the dry belt to the east of the Coast range. They are fairly numerous in certain spots, and except in the first few days in the season, when they are apt to be too tame, give splendid sport. About the best place for them is some seventy miles up the Caribou road. Good shooting can also be obtained in the Nicola and Okanagan districts.

The willow grouse is more or less plentiful all over the southern portion of the Province, more especially on some of the islands in the Gulf, and in

the crab-apple bottoms in the Lower Fraser valley. It is not generally considered to be a very good sporting bird, as, at the beginning of the season, it often flies into the nearest tree and gives a pot shot. However, if one goes after them in the latter part of the season, when they have become a bit wild, one will find, even if birds are plentiful, that they are by no means easy to shoot.

Blue Grouse

Two varieties of blue grouse are well worthy of attention. During October they find their way to the tops of the ranges, and when flushed on a hill-side nearly always fly downhill at a tremendous pace, giving one of the hardest kind of shots. They are found all over the Province, and are especially numerous in the Nicola and Okanagan districts. They are also plentiful on Vancouver island and the adjoining islands.

Ptarmigan

Ptarmigan are not found in any great numbers in the southern portion of the Province, though a few may always be seen on the tops of very high mountains. In the neighbourhood of Atlin they arrive in numbers about the end of September, and some splendid shooting can be had. There are two or three varieties of these birds; the one that is found in the greatest number is the rock ptarmigan, a very small bird that often goes in flocks of a hundred or more They are found high up on the mountains and are generally too tame to afford much sport. The black-tailed ptarmigan is, however, a bird for the sportsman. It is a little larger than the above-mentioned variety, and is found lower down the mountains. It inhabits the scrub-willow bottoms and wherever there is a little water these birds will be found. They are not so numerous as the other species, but are wilder, and, on a stormy day, fly well, taxing the skill of the best of shots.

All the ptarmigan frequent certain places, and it is necessary to have a man acquainted with their haunts, as otherwise one might spend several days and not see a bird. Bags will vary from ten to twenty-five brace per gun per day.

Pheasants

These birds are protected, but there is always an open season proclaimed by Order in Council for about two months during October and November. Very good shooting can be had close to Vancouver and Victoria, but the best of it is preserved by owners of land.

Capercailzie and Black Game

In September 1906, forty-six black game and thirty capercailzie were imported from Denmark by a committee of resident sportsmen, assisted by contributions from game-lovers in Great Britain and the United States. Only two birds were lost on the voyage, but seventeen more died shortly after arrival. The surviving fifty-seven were distributed to various parts of the Province.

From all available information the liberated birds are thriving in the new surroundings, and in time their progeny will, it is hoped, prove an important addition to the game birds of British Columbia.

European Partridges

European partridges have been introduced in the valley of the Lower Fraser and are increasing rapidly. Last spring a number of these birds were turned out on Vancouver island in the vicinity of Victoria.

About 30 partridges were imported by the Chilliwak Game Association in the spring of 1909, and turned out in the neighbourhood of Sardis. Numbers of good, strong coveys are frequently seen in that district, and as the farmers take great pride in them and see that they are protected, their success is assured there.

Two lots of 34 and 29, respectively, were imported during the fall of 1909, and the first lot was turned loose at Agassiz. The second was cared for until the worst of the winter was over and then distributed at various points.

Quail

Both California and mountain quail have been acclimatized on Vancouver island and the mainland. On the island both species have done remarkably well, and now furnish excellent sport.

On the mainland, "Bob White" quail have been tried, but neither they nor the other species have increased sufficiently to warrant their being shot.

In addition to the foregoing, there are numerous other game birds to be found in the Province.

Open Seasons and Bag Limits

MOOSE (bull):

September 1st to December 31st inclusive.

Bag limit—two in one season; one in Kootenay.

WAPITI (bull):

September 1st to December 31st. Two in one season.

CARIBOU (bull):

September 1st to December 31st. Three in one season.

DEER (buck or doe, except species known as Columbian or Coast deer): September 1st to December 15th. DEER (Columbian or Coast deer): Season opened by Order in Council each year, usually September 1st to December 15th.	Three of one kind or not more than five in all.

MOUNTAIN SHEEP (ram):

September 1st to November 15th. Two of any one species, or one in Kootenay; not more than three in all.

MOUNTAIN GOAT:

September 1st to December 15th. Three in one season.

BEAR:

Close season between July 15th and August 31st.
No bag limit.

Open Seasons for Game Birds

PHEASANT (cock) GROUSE (of all kinds) QUAIL (of all kinds) PRAIRIE CHICKEN PTARMIGAN	Season opened by Order in Council, usually October 1st. to December 15th; varies according to district.
DUCK (of all kinds) GEESE SNIPE	Bag limit, 250 in season. Season opened by Order in Council, usually September 1st to February 28th.

Non-resident Hunting Licenses

GENERAL LICENSE FOR SEASON	$100
LICENSE (deer, bear and goat, good for one month)	25
" (bear, in spring)	25
" (game birds, good for one week)	5
ANGLER'S LICENSE	5

Holders of the licenses can export all trophies legally obtained.

Non-resident Licenses Issued During Season of 1909

The number of general $100 licenses issued during the season of 1909, was only 53, being considerably below the number issued in 1908; but as there were 37 limited $25 licenses in addition, the total number of 90 big-game hunters was a decided increase over the 77 of the previous year.

The angler's license ($5) came into force for the first time in 1909 and 80 of these were issued.

The number of bird licenses issued was 69 ($5 each) and all except two were collected prior to 30th November; severe frosts during December spoilt the duck-shooting or the number would have been greater.

In all, 239 tourists either fished or shot in the Province during 1909.

In British Columbia a man has to pay $100 for a general license and $5 for an angler's license; so, for the sum of $105, he may kill two moose, one wapiti, three caribou, three goats, three sheep (only two of one species, and not more than one in the Kootenay), five deer, and grizzly and black bear without limit. In addition, he can get good wild fowl shooting, also pheasant and grouse, and the very finest trout and salmon fishing.

EXPENDITURE ON GAME PROTECTION FROM APRIL 1ST. TO DECEMBER 31ST. 1909

Salaries	$ 8,180.00
Travelling expenses	2,280.65
Government launch	2,283.63
Office	509.05
Total Expenditure	$13,253.33

ESTIMATED EXPENDITURE FOR BALANCE OF YEAR, TO MARCH 31st. 1910

Salaries	$ 2,400.00
Travelling expenses	750.00
Launch	250.00
Importation of birds, (partridges and prairie chicken)	500.00
Pheasant rearing	500.00
Stocking Queen Charlotte islands with deer	500.00
	$ 4,900.00

BRITISH

SUMMARY OF RESTRICTIVE

Species of Birds and Animals	Unlawful to Shoot or Destroy during Close Seasons as Shown Below (Dates both inclusive).
Columbian or Coast Deer*	At any time
Duck (of all kinds) and snipe*	At any time
Grouse* (of all kinds)	At any time
Prairie Chicken*	At any time
Ptarmigan*	At any time
Pheasant* (cock)	At any time
Pheasant* (hen)	At any time
Quail* (of all kinds)	At any time
Geese* (of all kinds)	At any time
Black Game and Capercailzie	At any time
Partridges*	At any time
Bear	15th July to 31st August
Beaver	1st April to 1st November
Birds living on noxious insects	At any time
Bittern	1st March to 31st August
Blackbird (English)	At any time
Caribou (bull)	1st January to 31st August
Caribou (cow or calf)	At any time
Chaffinch	At any time
Deer† (fawn under twelve months)	At any time
Deer† (buck)	15th December to 31st Aug.
Deer† (doe)	15th December to 31st Aug.
Elk, Wapiti (bull)	1st January to 31st August
Elk, Wapiti (cow)	At any time
Elk, Wapiti, (calf under two years)	At any time
Gull	At any time
Hare	1st January to 31st August
Heron	1st March to 31st August
Land Otter	1st April to 1st November
Linnet	At any time
Marten	1st April to 1st November
Meadow Lark	1st March to 31st August
Moose (bull)	1st January to 31st August
Moose, (cow and calf under twelve months)	At any time
Mountain Goat	15th December to 31st Aug.
Mountain Sheep (ram)	15th November to 31st Aug.
Mountain Sheep (ewe or lamb)	At any time
Plover	1st March to 31st August
Robin	Farmers only may shoot in gardens bet. June 1st and Sept. 1st.
Skylark	At any time
Swan	At any time
Thrush	At any time
Eggs of protected birds	At any time

* Season will be thrown open by Order in Council yearly.

† Except species known as Columbian or Coast deer. 1909, c. 20, s. 19.

COLUMBIA GAME

MEASURES IN FORCE

Unlawful to Buy, Sell, or Expose for Sale, Show or Advertisement	Unlawful to Kill or Take
At any time	More than five in one season.
At any time	More than two hundred and fifty in one season
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
At any time	
Before October 1st	More than three in one season.
At any time	
At any time	
At any time	
Before Sept. 1 and after Nov. 15.	More than five in one season, or hunt with dogs, or kill for hides alone.
At any time	
At any time	More than two in one season.
At any time	
At any time	
At any time	
Before October 1st	
During close season	
At any time	
At any time	
Before October 1st	More than two in one season and only one in the county of Kootenay.
At any time	
Before October 1st	More than three in one season.
Before October 1st	More than two of any one species, or more than one in the county of Kootenay.
At any time	
During close season	
At any time	
At any time	
At any time	
At any time	
At any time	To take or destroy at any time.

PROVINCIAL REVENUE FROM FISHERIES AND GAME

FISHERIES

NEW BRUNSWICK, 1908-1910

1908	Fishing licenses	$15,482.00
1909	" "	15,562.00
1910	" "	15,905.50

QUEBEC, 1908-1910

1907–8:

155	Salmon licenses at $25.00	$3,875.00
353	" " " 10.00	3,530.00
487	" " " 5.00	2,435.00
	Net fishing licenses	4,307.00

Twenty-two fishing licenses were issued during the year, each for a term of five years.

1908–9:

205	Salmon licenses at $25.00	$5,125.00
322	" " " 10.00	3,220.00
518	" " " 5.00	2,590.00
	Net fishing licenses	5,941.68

Twenty-six fishing licenses were issued during the year, each for a term of five years.

1909–10:

196	Salmon licenses at $25.00	$4,900.00
332	" " " 10.00	3,320.00
529	" " " 5.00	2,645.00
	Net fishing licenses	5,527.93

Thirty-one fishing licenses were issued during the year, each for a term of five years.

ONTARIO, 1908-1910

1908:

Licenses	$68,469.91
Manitou lake (payment on lease)	750.00
Sale of yachts "I'll See" and "Eva Bell"	780.00
Overpaid into treasury	1.00
Fines	12.45
Total revenue, 1908	$70,013.36

1909:

Licenses	$74,284.16
Sale of confiscated tugs	400.00
Fines	113.62
Total revenue, 1909	$74,797.78

1910:

Total revenue, 1910	$87,961.72

BRITISH COLUMBIA, 1908-1910

REVENUE FROM LICENSES IN 1908

Fisheries			Canneries		Fish Packing Establishments		Total for District
District	No.	Amount	No.	Amount	No.	Amount	Amount
Fraser river	1,857	4,642.50	10	1,000.00	17	1,700.00	7,342.50
Rivers inlet	1,196	2,990.00	13	1,300.00	3	300.00	4,590.00
Skeena river	1,751	4,377.50	12	1,200.00	3	300.00	5,877.50
Nass river	377	942.50	3	300.00	2	200.00	1,442.50
Outside districts	88	220.00	6	600.00	9	900.00	1,720.00
Total	5,269	13,172.50	44	4,400.00	34	3,400.00	20,972.50

REVENUE FROM LICENSES IN 1909

Fisheries			Traps		Canneries		Fish Pack'g Establishments		Total for Dist.
District	No.	Amount	No.	Amt.	No.	Amount	No.	Amount	Amount
Fraser river	2,614	13,070	12	300	42	4,200	9	900	18,470
Rivers inlet	1,017	5,085	....	.....	7	700	3	300	6,085
Skeena river	853	4,265	....	.....	10	1,000	3	300	5,565
Nass river	199	995	....	.....	3	300	3	300	1,595
Outside districts	25	125	....	.....	7	700	9	900	1,725
Total	4,708	23,540	12	300	69	6,900	27	2,700	33,440

GAME

NOVA SCOTIA, 1908-1910

1908	Licenses for game, guides, birds, etc.	$ 424.50
1909	" " " " " "	2,276.64
1910	" " " " " "	2,655.00

NEW BRUNSWICK, 1908-1910

1908	Game licenses	$32,071.00
1909	" "	34,516.13
1910	" "	42,255.13

QUEBEC

1907–8:

206 hunting licenses	at	$25.00	$5,150.00
262 hunting licenses	"	10.00	2,620.00
1,162 hunting licenses for residents	"	1.00	1,162.00

Twelve hunting leases were issued during the year, each for a term of five years.

1908–9:

208 hunting licenses	at	$25.00	$5,200.00
333 hunting licenses	"	10.00	3,330.00
1,463 hunting licenses	"	1.00	1,463.00

Fifteen hunting leases were issued during the year, each for a term of five years.

1909–10:

167 hunting licenses	at	$25.00	$4,175.00
284 hunting licenses	"	10.00	2,840.00
1,219 hunting licenses	"	1.00	1,219.00

Twenty-six hunting leases were issued during the year, each for a term of five years.

Nine thousand six hundred square miles are presently under lease for hunting purposes in the province of Quebec.

ONTARIO, 1908-1910

1908:	
Deer licenses, 1907[a]	$ 537.75
Deer licenses, 1908	14,585.75
Non-resident licenses, 1907	408.00
Non-resident licenses, 1908	7,475.00
Moose licenses, 1907	19.40
Moose licenses, 1908	2,614.97
Game dealers, 1908	626.00
Hotel and cold storage, 1908	249.00
Fines and confiscations, 1908	1,524.33
Total	$28,040.20
1909:	
Deer licenses, 1908[a]	$ 177.75
Deer licenses, 1909	238.50
Moose licenses, 1908	19.50
Moose licenses, 1909	160.15
Non-resident licenses, 1908	125.00
Non-resident licenses, 1909	1,975.00
Game dealers, 1909	356.00
Hotel and restaurant, 1909	67.00
Cold storage licenses, 1909	100.00
Guides' licenses, 1909	1,992.00
Fines, 1909	2,408.69
Confiscations, 1909	629.98
Total	$8,249.57
1910:	
Game trappers' licenses	$ 70.00
Non-resident licenses	7,875.00
Resident deer licenses	18,884.12
Resident moose licenses	3,219.97
Game dealers	638.00
Hotel, restaurant and club	167.00
Cold storage licenses	50.00
Guides' licenses	1,702.25
Fines	3,455.70
Sales	2,842.85
	$38,904.89

[a] The figures for 1907 and 1908, respectively, represent amounts which should have been received in those years, but which were not paid in until the succeeding year.

MANITOBA, 1908-1910

1908	Revenue from game	$ 8,894.00
1909	Revenue from game	15,705.90
1910	Revenue from game	17,987.06

SASKATCHEWAN, 1908-1910

1908	Game licenses	$478.00
1909	Game licenses	600.00
1910	Game licenses[a]	9,000.00

ALBERTA, 1908-1910

1908	Revenue from game	$2,504.50
1909	Revenue from game	4,783.50
1910	Revenue from game	6,578.95

BRITISH COLUMBIA, 1908-1910

1908:		
	Game licenses	$7,925.00
	Fines	1,150.00
		$9,075.00
1909:		
	Game licenses	$6,970.00
	Fines	1,545.00
		$8,515.00
1910:		
	General game licenses	$5,300.00
	Limited game licenses	925.00
	Anglers' license (first issued)	400.00
	Bird license	345.00
		$6,970.00

[a] The large increase in the revenue for 1910 over that of previous years is due to the fact that in that year residents were first required to take out licenses to hunt game in the Province.

MINERALS

THE MINING LAWS OF CANADA

THE following is a list of the various Dominion and Provincial laws and regulations respecting mining, arranged according to the provinces to which they apply.

Manitoba, Saskatchewan, Alberta, and North West Territories:

Dominion Laws and Regulations

Placer Mining Regulations.

Quartz Mining Regulations (applying also to Yukon).

Regulations Governing the Issue of Leases to Dredge, for Minerals in the submerged Beds of Rivers.

Coal Mining Regulations (applying also to Yukon, the Railway Belt, and Peace River Block).

Petroleum and Natural Gas Regulations (applying also to Yukon and Peace River Block).

Quarrying Regulations (applying also to Railway Belt and Peace River Block).

Yukon:

Yukon Placer Mining Act.

Regulations Governing the Issue of Leases to Dredge for Minerals in the Submerged Beds of Rivers in Yukon.

Alberta :

Regulations for the Disposal of Tar-sands, the Property of the Crown, in that Portion of the province of Alberta lying to the north of Township 80, and between the 4th and 5th Initial Meridians.

Parks and Forest Reserves:

Regulations for the Disposal of Coal Mining Rights and Mineral Claims within Lands set apart by the Dominion Forest Reserves Act and within Jasper Forest Park.

Regulations for the Issue of Leases to Mine for Coal on Lands situated within the Rocky Mountains Park.

Provincial Acts

Alberta:

Coal Mines Act.

British Columbia:

Coal Mines Act.
Coal Mines Regulation Act.
Mineral Act.
Inspection of Metalliferous Mines Act.
Placer Mining Act.

New Brunswick:

General Mining Act.

Nova Scotia:

Coal Mines Regulation Act.
Mines Act.
Regulations of Metalliferous Mines.

Ontario:

Mining Act of Ontario.

Quebec:

Quebec Mining Law.

Dominion Acts

The following is a synopsis of the different acts and regulations pertaining to the disposal and working of the mining lands of Canada.

The object of this compilation is to give the reader, in as few words as possible, a clear idea of how the mineral lands of Canada are disposed of, and to show what regulations are in force with respect to the safe working of the same.

Manitoba, Saskatchewan, Alberta and North West Territories

Placer Mining Regulations

5. All books of record and documents filed shall, during office hours, be open to public inspection free of charge.

10. The mining recorder may summarily order any mining works to be so carried on as not to interfere with or endanger the safety of the public or any employee of such mining works, or any public work or highway, or any mining property, mineral claim, drain or flume; and any abandoned works may, by his order, be either filled up or guarded to his

satisfaction. This provision, however, is not intended in any way to limit or interfere with the rights of any provincial or other government to regulate the working of mines within their jurisdiction.

Right to Acquire Claims

11. Any person 18 years of age, or over, may enter for mining purposes, locate and prospect upon any land upon which the prospecting and mining right is reserved to the Crown, except lands within the boundaries of a city, or lands occupied by buildings or Indian reservations.

12. No person shall enter upon private land for mining purposes unless security for damage is given. In case of dispute such compensation shall be determined by the court.

Size and Form of Claims

13. Claims shall be designated as creek claims, river claims, and inland claims.

14. A creek claim shall not exceed 500 feet in length, measured along the base line of the creek, established or to be established by a government survey. Every creek claim shall be as nearly as possible rectangular in form, and shall be marked by two legal posts firmly fixed in the ground on the base line at each end of the claim.

15. The rear boundaries of the claim shall be parallel to base line and shall be defined by measuring 1,000 feet on each side of the base line.

16. The survey of the base line shall also establish the side lines of the claims located on the creek.

17. A river claim shall be situated on one side of the river only, and shall not exceed 500 feet in length measured in the direction of the river. The rear boundary of the claim shall be defined by measuring 1,000 feet from low-water mark of the river.

18. Every river claim shall be approximately rectangular, and shall be marked by two legal posts firmly fixed in the ground at each end of the claim on the margin of the river.

19. Inland claims shall not exceed 500 feet in length by 1,000 feet in width.

(2) If such claims front towards a creek or river they shall be staked as nearly as possible in the general direction of the valley towards which they front.

20. Inland claims shall be rectangular, and shall be marked by two posts firmly fixed in the ground in a line parallel to the general line of the river and on the side nearest to the creek towards which they may front.

21. All measurements shall be horizontal.

22. The lines between the two posts shall be well cut out.

23. One flattened side of each post shall face the claim. Upon this side of the post shall be written the name or number of the claim, its length in feet, the date when staked, and the full name of the locator.

24. The posts shall be numbered 1 and 2; No. 2 may be moved by a Dominion land survey if the distance between the posts exceeds the distance prescribed by these regulations.

25. Failure on the part of a locator to comply with any of the foregoing provisions shall not be deemed to invalidate his location, if, upon the facts, it appears to the satisfaction of the mining recorder that there has been on the part of the locator a *bona fide* attempt to comply with the provisions of these regulations.

26. Any person or party locating the first claim on any creek, river, hill or beach, shall be entitled to a claim or claims respectively of the following size:

One locator, one claim, 1,500 feet in length.

A party of two locators, two claims each of 1,250 feet in length.

A party of more than two locators, two claims, each of 1,000 feet in length, and for each member of the party beyond two, a claim of the ordinary size only.

27. Claims granted previously to the promulgation of these regulations may be enlarged to the size of the claim allowed herein, if such enlargement does not interfere with any mining property owned by any other person.

Locating and Recording

28. For forms of grants and renewals, see schedules A. B. and C.

29. An application for a grant of a claim shall be filed with the recorder within ten days after the location thereof if it is located within ten miles of the recorder's office.

(2) One extra day shall be allowed for every additional ten miles or fraction thereof.

30. No grant shall be issued by a mining recorder for a part of a claim which is already recorded.

31. Locations made on Sunday are not for that reason invalid.

34. Any person undertaking a *bona fide* prospecting trip, may on payment of $2, receive permission from the mining recorder to record a claim at any time within a period not exceeding six months from the date of staking such claim.

35. No application shall be received for a claim which has not been staked by the applicant in person; provided that if any person satisfies the recorder that he is about to undertake a *bona fide* prospecting trip, and files a power of attorney from any number of persons, not exceeding two, he may stake one claim of the ordinary size in the name of each such person within the valley or basin of any creek upon which he makes a discovery.

36. Any person may abandon a claim by notifying the recorder of his intention to do so.

(2) Abandoned claims shall not be relocated within thirty days of their abandonment.

37. The recorder of a claim cannot locate another claim within the valley or basin of the same creek within sixty days of the date on which he has located the said claim.

Title

39. A grant for one year may be obtained for a recorded claim by paying to the recorder, in advance, the fees prescribed in schedule "D".

(2) The grant may be renewed from year to year if work to the value of $100 is done on the claim and recorded each year.

(3) Any work done outside of a claim, if it has a direct relation to the claim, may be deemed to be work done on the claim.

40. The claim shall be forfeited if work to the value of $100 is not performed each year.

41. If the owner of a claim has done the required work thereon, but does not renew his grant, the claim may be restaked and a grant issued to a second person. Proviso: The owner may within six months have the second grant cancelled, but must pay the fees and expenses of the relocator.

42. Co-owners shall contribute in proportion to their interests for the work required to be done to hold the claim.

43. When a claim is sold or disposed of, the instrument showing such disposal shall be deposited in duplicate with the recorder.

44. All agreements affecting the title of a claim shall be recorded.

45. The grantee has the right to fish and shoot, (subject to the provisions of any law for the protection of fish and game) and cut timber for his own use; and the exclusive right to enter upon the claim for mining purposes.

Grouping

48. Persons owning a group of ten adjoining claims may obtain permission, for a term not exceeding ten years, to perform on any one or more claims all the work required to entitle them to a renewal grant for each claim. Provided, that where the application is made by more than one person, the applicants shall file with the mining recorder a deed of partnership creating a joint liability between the owners for the joint working thereof.

49. Grants of such claims and grants of any claims owned by one person may be made renewable on the same day.

Water Rights

50. A claim owner is entitled to the seepage water on the claim and the right to use as much of the water flowing past his claim and not already appropriated, as, in the opinion of the Inspector, is necessary for the working of the claim; and he shall also be entitled to drain his own claim free of charge.

51. The mining recorder may grant to a claim owner the right for five years to divert water for his own use from any stream or lake, also the right of entry upon any mining ground for the purpose of conveying such water, provided that security is given to cover any damage done to such claims.

52. Every applicant for a water grant shall, for twenty days previous to the making of the application, post notice of his intention to apply for such grant:

(a) At the point of proposed diversion.

(b) On the claim on which such water is intended to be used.

(c) On each person's land to be crossed by the water in course of transit.

(d) In the office of the mining recorder; and shall forward such notice to the gold commissioner.

(2) Such notice shall state:

(a) Name of applicant.

(b) Name or description of the stream, lake or other source from which water is intended to be diverted or taken.

(c) The point of diversion, and the point where the water is to be returned to the stream.

(d) The means by which it is intended to divert or take, or to store the water.

(e) The number of inches of water to be applied for.

(f) The purposes for which is it required.

(g) The claim upon which the water is to be used, or if the right to sell water is asked, the locality within which the right is to be exercised; and

(h) The date of the posting of the notice and the date on which application will be made to the mining recorder for the granting of the record.

53. On the day mentioned in the notice of application or at a subsequent time, application shall be made by or on behalf of the applicant, either in person or by writing, for a grant in accordance with the terms of the notice.

56. Holders of water grants must not waste water. The mining recorder may cancel or reduce the water grant in case of waste or excess.

57. Every grant of water on an occupied creek shall be subject to the rights of such owners.

58. If, after the grant has been made and persons locate and begin to work any claim below the ditch head on any creek so diverted, they shall be entitled

To 40 inches, if 300 inches or less are diverted.

To 60 inches, if over 300 inches are diverted.

Measurement of Water

(a) Water taken into a ditch or sluice shall be measured at the ditch or sluice head.

(b) No water shall be taken into a ditch except in a horizontal trough.

(c) One inch of water means one-half the quantity of water flowing through a rectangular orifice 2 inches high by 1 inch wide under a constant head of 7 inches above the upper side of the orifice.

(d) A sluice head shall consist of 50 such inches of water.

60. The owner of a ditch shall construct the necessary culverts.

61. Ditches shall be kept in good repair so as not to do damage to any other property.

63. The penalty for the non-repairing of a ditch is cancellation of the water grant.

64. A transfer of a claim shall include the water privileges.

65. Provided always that the above regulations for the diversion of water for mining purposes are issued subject to the provisions of the Irrigation Act, in so far as such Act applies to the provinces and territories affected by these regulations.

Drainage

66. The mining recorder may grant permission to run a drain or tunnel for drainage purposes over any occupied or unoccupied land.

67. The grantee shall compensate the owners of such land for any damage done by such entry.

68. Drains or tunnels shall be the property of the constructor.

Schedule "D"

Scale of Prices to be Charged

For grant of a claim for one year	$ 5.00
For renewal of grant of a claim	5.00
Recording an abandonment	2.00
Registration of any document	2 00
If it affects more than one claim, for each additional claim	0.50
For filing any document	1.00
Abstract of title:	
For first entry	1.00
Each additional entry	0.50
For copy of document:	
Up to 200 words	1.00
For each additional 100 words	0.50
For grant of water:	
Of 50 inches or less	5.00
From 50 to 200 inches	10.00
From 200 to 1,000 inches	20.00
For each additional 1,000 inches or fraction thereof	20.00

Quartz Mining Regulations [a]

1. These regulations shall be applicable to all minerals defined as such on Dominion Lands, situated elsewhere than in British Columbia.

[a] These regulations apply also to the Yukon.

Duties of Mining Recorder

5. All books of record and documents filed shall, during office hours, be open to public inspection free of charge.

8. The Mining Recorder may mark out a space of ground for deposit of leavings and deads from any tunnel, claim, or mining ground, upon such terms as he may think just.

9. The Mining Recorder shall have the power to order any mining to be so carried on as not to endanger the safety of the public highways, public, mining property or any employees of such mining works; and any abandoned works may by his order be either filled up or guarded to his satisfaction.

Right to Acquire Claims

11. Every person 18 years of age, or over, shall have the right personally, but not through another, except, as provided in section 39 of these regulations, to enter, prospect and locate upon any vacant Dominion Lands for all minerals other than coal, and upon all lands reserved to the Crown and open for prospecting. Excepting the Dominion Lands situated in British Columbia and any land occupied by dwellings, cemetery, Indian reservation or land under cultivation. No person shall enter upon, for mining purposes, or shall mine upon lands owned by another unless compensation is made to the occupant for any damage which may be caused thereby.

Size of Claim

12. Any person discovering mineral in place may locate a claim 1,500 feet by 1,500 feet, in which all angles shall be right angles, but the boundaries need not necessarily be due north, south, east and west lines.

13. No person can hold in his own name, or in the name of any other person more than one claim on the same vein, or within a distance of half a mile, except by purchase, but such person may locate upon a separate vein.

Locating and Recording

14. A mineral claim shall be marked by two posts (1 and 2) on the line of the vein, and 1,500 feet apart. Upon the posts shall be written the name of the claim, the locator, and date of location. No. 1 post shall also bear the name "Initial Post," and the approximate compass bearing to post No. 2 and the number of feet lying to right and left of the line from post No. 1 to post No. 2.

15. All the particulars placed on the posts shall be furnished by the locator to the mining recorder at the time the claim is recorded, and shall form a part of the record of such claim.

16. The line between the posts 1 and 2 shall be blazed or marked by stone or earth monuments.

17. A discovery post must be erected at the point of discovery and marked "Discovery Post."

19. It shall be unlawful to move Post No. 1, but a Dominion Land Surveyor may move post No. 2, when the distance between posts Nos. 1 and 2 exceeds 1,500 feet.

20. The penalty for disturbing any legal posts is $100.

22. The claim, if within ten miles of recorder's office, must be recorded within fifteen days of its location. One day extra is allowed for each additional ten miles.

23. In the event of the claim being more than 100 miles from a recorder's office, and situated where other claims are being located, the locators, not less than five in number, are authorized to meet and appoint one of their number an "Emergency Recorder" who shall act in that capacity until a Mining Recorder is appointed.

24. The emergency recorder shall notify the recorder of his appointment at the earliest possible date.

25. The holder of a mineral claim is entitled to all minerals, the property of the Crown, which may lie within his claim.

26. Applications for record shall be accompanied by an affidavit after the manner of Form "A."

28. Locations made on Sunday shall not for that reason be invalid.

29. The Minister may grant a location for the mining of iron and mica not exceeding 160 acres in area, which shall be square, the boundary lines to run N.-S., E.-W. The grant, however, shall not include the surface of the location. Provided that if any person should in this way gain possession of a valuable mineral deposit other than iron or mica, the right to such deposit shall be restricted to 1,500 feet square and the rest of the area, as far as valuable mineral is concerned, shall remain in the Crown at the disposal of the Minister.

30. Provided also that requirements as to location and survey of claims contained in these Regulations shall govern such locations as far as they can be made to apply, and provided also that the amount to be paid to the Government for such locations or the amount of work to be done on the same from year to year or to obtain a Crown grant, shall be determined by the Minister.

31. A locator shall not be entitled to a record of a mineral claim until he has furnished the Mining Recorder with all the above particulars.

32. Records shall be made at the office of the Mining Recorder of the district in which the claim is situated.

33. The interest in a claim is a chattel interest.

34. Notice of abandonment of claim must be given in writing.

35. When the holder of a claim abandons it, he shall have the right to remove the machinery, any personal property which he may have placed on the claim, and any ore which he may have extracted therefrom, within such time as shall be fixed by the Mining Recorder.

36. No one shall re-locate a mineral claim which he has failed to record in time or shall have abandoned, unless he has obtained written permission from the recorder to make such re-location.

37. Where a tunnel is run for the development of a vein or lode the owner of the tunnel shall have the right to all veins or lodes discovered in such tunnel, provided that he marks out the ground as a mineral claim and records it within fifteen days after the discovery; and provided, further, that such veins are not included in any existing mineral claim. Any money expended in constructing a tunnel to develop a vein shall be deemed to have been expended on the vein.

38. Any person, upon satisfying a Mining Recorder that he is about to undertake a *bona fide* prospecting trip, may receive written permission from the Mining Recorder, allowing him to record a claim within his district at any time within six months from date of staking such claim.

39. No application shall be received for a claim which has not been staked by the applicant in person: provided that if any person satisfies the recorder that he is about to undertake a *bona fide* prospecting trip, and files a power of attorney from any number of persons, not exceeding two, he may stake one claim of the ordinary size in the name of each such person upon any lode or vein which he may discover, subject, however, to the provisions of section 13 of these regulations.

Grouping

40. Adjoining claims, not exceeding eight in number, may be worked by the owners thereof in partnership when they file a notice of their intention with the Mining Recorder. Upon obtaining a certificate according to Form "E" the holders may perform on any one or more claims all the work required to entitle them to a certificate of work for each claim. If a certificate of work is not obtained and recorded each year, the claim shall be deemed vacant and abandoned.

Representation

41. A person having recorded a mineral claim shall be entitled to hold the same for one year, and thence from year to year without the necessity of re-recording, provided that each year, the locator causes work to be done to the value of one hundred dollars and, within fourteen days after the expiration of the year, satisfies

the Mining Recorder that such work has been done and obtains a certificate of work on Form "D." Provided, also, that all work done in the direct proximity to the claim for the purpose of working it shall be deemed, for the purpose of this section, to be work done on the claim.

42. The holder of a mineral claim may, in lieu of the work required to be done by section 41, pay $100 to the recorder each year.

43. Co-owners shall contribute, to the work required to be done, in proportion to their interests.

Title

44. The holder of a mineral claim shall be entitled to a Crown grant thereof on payment to the Dominion Government of the sum of $500 in lieu of expenditure on the claim, in addition to the amount payable as provided by section 57 of these regulations.

45. When the holder of a mineral claim has complied with the following requirements he shall be entitled to a certificate of improvements:

(a) Has done mining work on the claim to the value of five hundred dollars, exclusive of all houses, buildings and other like improvements.

The cost of the survey, not to exceed one hundred dollars, however, shall be counted as work done on the claim.

(b) Has found a vein on the claim.

(c) Had the claim surveyed at his own expense in accordance with instructions from the Surveyor General, by an authorized Dominion Land Surveyor, and the survey approved by the Surveyor General.

(d) Shall have posted on the claim a copy of the survey plan signed and certified by the Surveyor, and a notice, in Form "G," of his intentions to apply for a certificate of improvements. He shall also post a similar notice in the recorder's office, and such notice shall contain:

(1) The name of the claim.

(2) The name of the lawful holder thereof.

(3) His intention to apply for a certificate of improvements at the end of sixty days, for the purpose of obtaining a Crown grant.

(4) The date of the notice.

(e) Inserted a copy of such notice in a newspaper, approved of by the recorder and published in and circulated in the district. The insertion can be made at any time after the posting of the notice on the claim and shall run for at least sixty days prior to such application.

(f) Shall have filed with the recorder a copy of the surveyor's original field notes and plan, signed and certified, immediately after posting the notice on the claim of his intention to apply for a certificate of improvements.

(g) Filed with the recorder an affidavit made out according to Form "H."

(h) At the expiration of the term of the said publication, provided no action shall have been commenced and notice thereof filed with the recorder, the recorder shall forward to the owner or agent, under Form "I", the documents referred to above, together with a certificate that subsection (d) has been complied with and that the necessary document had been filed with him. Compliance with the provisions of section 63 of these regulations will be accepted in lieu of the notice and publication required by this section.

46. A certificate of improvements shall not be impeached in any court on any ground except that of fraud.

47 and 48. After the certificate of improvements has been issued and recorded it shall not be necessary to do any more work on such claim, and the holder thereof shall be entitled to a Crown grant of the same on the payment of the purchase money required by section 57.

49. The holder of the mineral claim must, within three months from the date of the issue of the certificate of improvements, apply to the Minister through the mining recorder for a Crown grant of the claim. He shall inclose with the application his certificate of improvements, the mining recorder's receipt for the payment of the purchase money of the claim at the rate of one dollar per acre, and the Crown grant fee of five dollars, the Mining Recorder's Certificate, Form "I," the field notes and plan of survey and the affidavit, Form "H."

50. The holder of a mineral claim on vacant Dominion lands shall be entitled to all surface rights, including the right to cut, free of dues, such of the timber on the location as may be necessary for the working of the same, but not for sale or traffic except where such timber has been granted prior to the date of entry. The Timber Agent, however, may permit any person to cut and remove the timber from a claim for his own use for mining purposes when such timber cannot otherwise be had within a reasonable distance; but no such permit shall convey the right to cut or remove timber required by the holder of the claim for his mining operations.

51. In Yukon, the timber on a claim shall be reserved until the mining recorder certifies that the same is required for use in mining operations. The right to use such timber may then be given to the holder of the mineral claim by the Crown Timber and Land Agent on the approval of the Commissioner. The Commissioner, however, may authorize the Timber Agent to issue a permit to any person to cut and remove timber from a mineral claim when the required timber cannot be obtained within a reasonable distance of the place of his mining operations.

52. In case of any dispute, the title to the claim shall be recognized according to the priority of the location.

54. A Crown grant of a mineral claim located on vacant Dominion Lands shall be deemed to transfer and pass the surface right and right to all minerals within the meaning of these regulations (excepting coal) found in veins, lodes, or rock in place.

55. Crown grants of mineral claims located on lands the surface rights of which have been disposed of, shall pass to the grantee the mineral rights only.

56. Where the mineral claim is located on land occupied under a timber lease, the Crown grant shall convey the surface and mineral rights, but shall reserve the timber.

57. The price to be paid for a mining location shall be at the rate of one dollar per acre.

Surveys

63. The cost of the survey of a mineral claim, not exceeding one hundred dollars, however, shall be accepted in lieu of representation work on the claim for the year in which the survey is made, whether it is the first year or not: provided that notice of such survey is immediately inserted, for a period of not less than sixty days, in a newspaper published in or circulating in the district in which the claim is situated, such paper to be approved by the Mining Recorder; and provided further that the owner of the claim prior to the first appearance of this advertisement shall cause to be posted in a conspicuous spot on the claim, and in the office of the Mining Recorder for the district, a notice of his intention to advertise the survey of the claim, and also a copy of the plan of the survey prepared and certified correct, under oath, by Dominion Land Surveyor. The survey shall be accepted as defining absolutely the boundaries of the claim surveyed, provided it remains unprotested during the period of publication, and provided it has been duly approved by the Surveyor General. If, however, within the time specified the survey is protested, the protest shall be heard and decided upon in accordance with the provisions of subsection 2, of section 46 of these regulations. The publication of the notice of survey as above provided shall be accepted in lieu of the notice and publication required by sub-clauses (d) and (e) section 45 of the said regulations. If notice of survey, however, is not given until the expenditure required by sub-clause (a) of section 45 of the regulations has been incurred, then the notice required by that section of the regulations must be given.

Sale or Transfer

64. No transfer of any mineral claim shall be effectual unless the same is in writing and accompanied by the record of entry (Form "B") signed by the transferrer and recorded by the mining recorder.

65. Every conveyance, bill of sale, mortgage or other document of title relating to any mineral claim not held as real estate or mining interest, shall be recorded with the mining recorder. Provided always, that failure to so record any such document shall not invalidate the same.

66. If the holder of a claim, after applying for a certificate of improvements, shall sell and transfer such claims, the new holder of the claim shall be entitled to a certificate of improvements in his own name.

Royalty

69. The patent for a mining location shall reserve to the Crown forever a royalty not exceeding 2½ per cent of the sales of the products of the location.

70. The Minister may abolish the collection of royalty on gold produced from any quartz claim or group of quartz claims in the Yukon, in respect to which an expenditure of not less than $25,000 has been made within five years after the issue of the patent for such claims.

74. No royalty shall be collected on the output of any copper mining location in the Yukon, or of any group of such locations in respect of which expenditure of money has been made to the amount of not less than $50,000 within ten years after the date of issue of the patent for such claims.

76. Up to January, 1928, no royalty shall be charged on the production of iron, or on copper up to the 1st of January, 1921.

Mill Sites

84. Any unoccupied and unreserved Crown land not known to contain mineral, and not exceeding five acres may be located as a mill-site. Lands valuable for water-power are excepted from location as mill-sites unless with the authority of the Governor in Council. No person shall be entitled to obtain and hold under this section more than one mill-site for each mineral claim lawfully held by him. Such mill-site shall be as nearly as possible in the form of a square. On locating a mill-site, the locator thereof shall comply with the following requirements:

(a) Mark out the land by placing a legal post at each corner.

(b) Post a notice on each post, stating:

(1) The name of such locator.

(2) His intention at the expiration of sixty days from the date of the notice to apply for the land as a mill-site.

(3) The date of notice.

(c) Post a copy of such notice in the office of the Mining Recorder.

85. On the expiration of sixty days after the fulfilment of the above requirements, the locator shall deposit in the office of the Mining Recorder a plan and field notes made by an authorized Dominion Land Surveyor in

accordance with instructions from the Surveyor General, and prove by affidavit that he has complied with the above requirements, and that the said land is not known to contain minerals, and is not valuable for water-power, and he shall furnish such other proof of the non-mineral character of the land as the Mining Recorder may require.

86. If the plans and field notes are approved by the Surveyor General and the proof referred to in section 85 has been furnished, the applicant shall then be entitled to a lease for one year. If, during the continuance of such lease, the lessee constructs works to the value of at least $500, he shall be entitled to a Crown grant of the mill-site upon payment of five dollars per acre for such land and a fee of five dollars.

87. On applying for a Crown grant of a mill-site, the applicant shall:

(1) Pay the sum of five dollars per acre to the Mining Recorder.

(2) Deposit with the Mining Recorder the following documents:

(a) Lease of the mill-site.

(b) Plan of the mill-site.

(c) Certificate from the Mining Recorder that works or machinery for mining or milling purposes have been placed or constructed on the mill-site to the value of at least five hundred dollars. (Form "L").

(d) Application for the Crown grant. (Form "M").

88. Crown grants of a mill-site shall pass to the grantee all the surface of the land in the said Crown grant mentioned, but all such Crown grants shall expressly reserve all minerals under the said land, and the right to the Crown and its licensees to enter and mine the said minerals.

Tunnels and Drains

89. Any holder of a mineral claim may obtain a license to run a drain or tunnel for mining purposes, through any occupied or un-occupied lands; but the licensee must give security to the Recorder for any damage that may be done thereby.

Water Rights

90. Water rights may be obtained in accordance with the provisions of the Irrigation Act. In Yukon, water rights shall be acquired under the provisions of the Yukon Placer Mining Act or under the provisions of the regulations for the disposal of water for power purposes, according to the purpose for which the water is to be used.

Miscellaneous

91. No person carrying on mining shall cause damage to any other claim by pumping water, throwing earth, stones or other material upon such other claim under penalty of not more than $50, and costs.

Dredging Regulations in the Prairie Provinces

The following Regulations[a] govern the issue of leases to dredge for minerals in the submerged beds of rivers in Manitoba, Saskatchewan, Alberta and the North West Territories, excepting rivers in Yukon.

The Agent of Dominion Lands in whose district the portion of the river desired to be leased is situated is authorized to accept applications, and leases may be issued by the Minister of the Interior upon the following conditions:

1. The lessee shall be given the exclusive right to subaqueous mining and dredging for minerals with the exception of coal in and along an unbroken extent of five miles of the river following its sinuosities and to be described by the applicant in such manner as to be easily traced on the ground.

Not more than 2 leases, each including an unbroken extent of five miles of a river, shall be issued in favour of one individual or company.

2. The lease shall be for a term of twenty years, at the end of which time all rights vested in, or which may be claimed, by the lessee are to cease and determine. The lease may be renewable, however, from time to time thereafter in the discretion of the Minister of the Interior.

3. The lessee's right to mining and dredging shall be confined to the submerged bed or bars in the river, below low water mark.

The holder of more than one dredging lease on the Saskatchewan river, however, shall also have the right to dredge during the period of his leases, between high and low water mark, on both sides of the river within each alternate five miles of his leaseholds. Such privilege to be subject to the rights of persons operating bar diggings under the provisions of Section 1 of the Regulations governing placer mining along the North Saskatchewan river in Alberta and Saskatchewan, also subject to any entries granted for bench claims under the provisions of the above Regulations prior to the date upon which the leaseholder furnishes the Agent of Dominion Lands, within whose district his leaseholds are situated, with a description of the particular alternate five miles upon which he desires to operate between high and low water mark.

4. The lease shall be subject to the rights of all persons who have received or who may receive entries for bar diggings or bench claims under the mining regulations.

5. The lessee shall have at least one dredge in operation upon the five miles of river leased to him, within one season from the date of his lease, and if, during one season when operations can be carried on, he fails to efficiently work the same to the satisfaction of the Minister of the In-

[a]Order in Council of the 21st and 29th July, 1897, as amended.

terior, the lease shall become null and void unless the Minister of the Interior shall otherwise decide. Provided that when any company or individual has obtained more than one lease, one dredge for each fifteen miles or portion thereof shall be held to be compliance with this regulation. This provision shall also apply to leases issued anterior to 13th January, 1899.

6. The lessee shall pay a rental of $10 per annum for each mile of river leased to him, such rental to be paid in advance, and to commence to accrue on the date upon which the lease is issued. He shall also pay to the Crown a royalty of two and one-half per cent on the output after it exceeds $10,000, as shown by sworn returns to be furnished monthly by the lessee during the period that dredging operations are being carried on. Said royalty to be paid monthly. This provision shall also apply to leases issued anterior to 13th January, 1899.

7. The lessee shall not interfere in any way with the general right of the public to use the river in which he may be permitted to dredge, for navigation and other purposes; the free navigation of the river shall not be impeded by the deposit of tailings in such manner as to form bars or banks in the channel thereof; and the current or stream shall not be obstructed in any material degree by the accumulation of such deposits.

8. The lease shall provide that any one who has or who may receive entry under the mining regulations shall be entitled to run tailings into the river at any point thereon, also to mine two feet below the surface of the water at low water mark by putting in wing-dams.

Provided that it shall not be lawful for such person to construct a wing-dam within one thousand feet from the place where any dredge is being operated, nor to obstruct or interfere in any way with the operation of any dredge. This provision shall also apply to leases issued anterior to 13th July, 1899.

9. The lease to be issued shall reserve all roads, ways, bridges, drains and other public works and improvements now existing, or which may hereafter be made in, upon or under any part of the river, and the power to enter and construct the same. It shall also provide that the lessee shall not damage nor obstruct any public ways, drains, bridges, works and improvements now or hereafter to be made upon, in, over, through, or under the river; and that he will substantially bridge or cover and protect all the cuts, flumes, ditches, and sluices, and all pits and dangerous places at all points where they may be crossed by a public highway or frequented path or trail, to the satisfaction of the Minister of the Interior.

Coal Mining Regulations [a]

The following are the regulations for the disposal of coal mining rights, the property of the Crown, in the provinces of

[a] Order in Council, April 20th, 1910.

Manitoba, Saskatchewan, Alberta, Yukon, the North West Territories, and the Railway Belt and the Peace River Block in the province of British Columbia.

1. The coal mining rights, which are the property of the Crown in the above mentioned provinces and territories may be leased for a term of twenty-one years at an annual rental of $1 per acre, payable yearly in advance. The term of the lease shall be for twenty-one years and renewable for a further term of twenty-one years provided that the lessee can prove to the Minister of the Interior that he has complied fully with the terms of the lease and with the provisions of the regulations under which it was granted.

2. No applicant shall be allowed to lease more than an area of 2,560 acres.

3. If the tract applied for is in a surveyed territory it shall consist of contiguous sections or legal subdivisions of sections and shall not exceed four miles in its greatest dimension; the length shall not exceed four times the breadth. In unsurveyed territory, if the tract applied for is so situated as to admit of a definite description by sections and legal subdivisions of sections being furnished, the application may be considered under this section.

4. Applications for such coal mining rights shall be filed with the Agent of Dominion Lands or with a sub-agent, for such district for transmission to the Department of the Interior; but priority of location shall be based on the receipt of the application in the office of the Agent of Dominion Lands. The application shall contain a description by section, part of section, township and range of the tract applied for.

5. The application for a lease in unsurveyed territory shall be filed by the locator in person with the district agent of Dominion Lands for transmission to the Department of the Interior, within thirty days from the date upon which the location applied for was staked in accordance with section (6) of these regulations. If the location is distant more than one hundred miles from the office of the Agent, the locator shall be allowed one additional day for each ten miles or fraction thereof, in excess of one hundred miles.

6. The applications shall contain a description by metes and bounds of the tract applied for, and shall be accompanied by a plan showing the position of such tract in its relation to some prominent topographical feature or other known point. The plan shall contain sufficient data to admit of the position of the tract applied for being definitely shown in the records of the Department. Such tract must be rectangular in form, the length not to exceed four times the breadth.

The application shall be accompanied by evidence supported by affidavit to show that the following have been complied with:

(a) That the location applied for has been defined on the ground by the locator in person by planting two wooden posts, at least four inches square, and standing not less than four feet above the ground, the posts being numbered "1" and "2" respectively. The distance between the posts shall not exceed 21,120 feet. There shall be inscribed on the posts, the name of the locator and the date of the location. Upon No. 1 post there shall also be written, the words "initial post," the approximate compass bearing of post No. 2 and a statement of the number of feet lying to the right and left of the line between the posts. The line shall also be marked out, by blazing the trees in a timbered region, or in the absence of timber the line shall be marked out by rock or earth monuments.

(b) All the particulars inscribed on the posts shall be set out on the application and shall be accompanied by a plan showing the position of the tract in its relation to some prominent topographical feature or other known point.

(c) A notice shall be posted on the tract stating that an application for a lease of the same will be made within thirty days from date.

(d) The application shall be accompanied by evidence, supported by affidavit, to show that the above requirements of the regulations have been fully complied with.

Where two or more persons lay claim to the same location, the rights to the lease shall be according to priority of location, if such location has been made in accordance with these regulations, and if the application has been made within the specified time.

8. As soon as the survey of a township has been confirmed all leased tracts shall conform to the Dominion Lands system of survey and a new lease will be substituted describing such tracts as sections, sub-divisions of sections, etc.

9. As soon as a township survey has been confirmed, all leaseholds found to be the property of the Hudson's Bay Company shall be subject to withdrawal from the lease, without compensation to the lessees.

10. The lessee shall commence active operations within one year from the date of the receipt of notification from the Department of the Interior to do so, and shall produce the quantity of coal specified. Such notification shall not be given within one year from the date of lease. The maximum amount of coal specified shall not exceed 10 tons per annum for each acre leased. If operations are not carried on within the time specified, the lease shall be subject to cancellation.

11. The lessee shall not assign, transfer or sublet the rights described in his lease without obtaining the consent of the Minister in writing.

12. The boundaries beneath the surface shall be the vertical planes in which their surface boundaries lie.

13. All leases issued under these regulations shall be subject to the provision that actual settlers shall be entitled to buy coal for their own use at a price not to exceed $1.75 per ton at the pit-head, and the lease issued for coal rights shall be made subject to such provision.

14 and 15. Application for lease shall be in such form as may be determined by the Minister of the Interior and shall be accompanied by a fee of $5, which will be refunded if the rights applied for are not available.

16. Within thirty days from the granting of the application the locator must pay to the Agent of Dominion Lands the full amount of the rental for the first year of the term of the lease, such rate shall be one dollar per acre. If the rental is not paid within the time specified, the application shall absolutely lapse.

17. If, during the term of the lease, the lessee shall fail to pay the rental in advance for each subsequent year at the rate of one dollar an acre per annum, within thirty days after the date upon which the same became due, the lease shall be subject to cancellation in the discretion of the Minister.

18. If the location is situated in surveyed territory, and the surface rights thereof have been disposed of, the Minister may, in consideration of the expenditure to be incurred by the locator in prospecting on the tract leased, and upon application to that effect being filed with the Agent of Dominion Lands of the district, waive the payment of the rental for the first two years, subject to the following conditions:—

(a) Each such application shall be accompanied by a fee of one hundred dollars ($100), which amount will be deducted from the expenditure which the locator shall be required to incur in prospecting operations on his leasehold during the first year of the term of his lease. Such fee shall be refunded to the locator if the application is not granted.

(b) Subject to the deduction of the one hundred dollar fee, as provided in the foregoing subsection (a), the locator shall expend in actual prospecting operations upon his leasehold, by recognized methods, during each of the first and second years of the term of his lease, the sum of not less than one dollar ($1) for each acre of the total area of his location, and shall, prior to the termination of each of the said two years, submit evidence, satisfactory to the Agent, supported by affidavit, to show that he has incurred the required expenditure in actual prospecting operations, by recognized methods, on the tract covered by his location. If the lessee fails to submit such evidence in the manner prescribed, the lease shall be subject to cancellation in the discretion of the Minister and to the immediate forfeiture of all the rights granted thereunder.

19. In addition to the rent, a royalty of 5c per ton of 2,000 lbs. shall be levied and collected on the merchantable output of the mine. The operators shall furnish the agent of Dominion Lands with sworn returns monthly or at such times as the Minister of the Interior may direct.

20. If the mine is not being operated, the owners shall furnish the agent of Dominion Lands with a sworn statement to that effect at least once in each year.

21. Default in payment of the royalty, or in furnishing the returns, if continued for 30 days after it is demanded by the agent of Dominion Lands, may be followed by cancellation of the lease.

22. Any attempt to defraud the Crown by withholding any part of the revenue thus provided for, by making false statements of the amount taken out, may be punished by fine or cancellation of the lease.

23. The Agent of Dominion Lands or any other officer designated by the Minister shall have the right to enter upon any coal mining land and examine all books to ascertain whether or not the terms of the lease are being complied with.

24. The lease shall include the coal mining rights only, but the lessee may, upon application, be permitted to purchase at the rate of $10 per acre whatever area of the available surface rights thereof the Minister may consider necessary for the efficient and economical working of the coal mining rights granted under such lease.

25. The lessee of a coal mining location cannot enter upon the land covered by a timber license, grazing or petroleum lease except by the permission of the Minister and at all times such entry shall be subject to such conditions for the protection of the rights of such lessee or licensee as it may be considered necessary to impose.

26. In a coal mining location where the surface rights have been disposed of the holder of the location can obtain the same by purchase. In case such rights are necessary for the economical working of the location but cannot be obtained by purchase, application shall be made to the Minister for permission to submit the matter in dispute to arbitration. Such application can only be made if the mineral rights under such area are reserved to the Crown. Upon receiving such permission it shall be lawful for the lessee to give notice to the owner or occupant to appoint an arbitrator within sixty days from the date of such notice, to act with another arbitrator named by the lessee, in order to determine what portion of the surface rights the lessee may reasonably acquire.

(a) For the efficient and economical operation of the rights and privileges granted him under his lease.

(b) The exact position thereof, and

(c) The amount of compensation to which the owner or occupant shall be entitled.

If the owner or occupant of the land refuses to appoint an arbitrator, the Agent of Dominion Lands may appoint an arbitrator on his behalf.

27. In case the two arbitrators cannot agree upon the award to be made, they may within a period of ten days from the date of the appointment of the second arbitrator select a third arbitrator, and when such two arbitrators cannot agree upon a third arbitrator, the Agent of Dominion Lands for the district shall forthwith select such third arbitrator.

29. In making such valuation, the arbitrators shall determine the value of the land irrespective of any enhancement thereof from the existence of minerals thereunder.

30. The award of any two such arbitrators made in writing shall be final, and shall be filed with the Agent of Dominion Lands within twenty days from the date of the appointment of the last arbitrator.

31. The arbitrators shall be entitled to be paid $5 per day with their necessary travelling and living expenses while engaged in the arbitration, and the costs of such arbitration shall be borne by the lessee.

Petroleum and Natural Gas [a]

1. The petroleum and natural gas rights which are the the property of the Crown in Manitoba, Saskatchewan, Alberta, Yukon, North West Territories, the Railway Belt, and Peace River Block may be leased to applicants at a rental of twenty-five cents an acre for the first year, and fifty cents per acre for each subsequent year. The term of lease shall be twenty-one years, renewable for a further term of twenty-one years, provided the terms of the lease and all regulations in force with respect thereto, have been complied with.

2. The area applied for shall not be greater than 1,920 acres.

3. In surveyed territory the tract shall consist of adjoining sections or legal sub-divisions of sections, and the length shall not exceed three times its breadth. In unsurveyed territory, if at least one of the lines bounding the section applied for has been surveyed, and such survey has been approved, the application for a lease shall come under this section.

4. Application for a lease in surveyed territory shall be filed in person with the agent of Dominion Lands for that district, or with a sub-agent for transmission. Priority of application shall be based upon the date of the receipt of the application in the office of the agent of Dominion Lands.

5. In case the surface rights of the tract applied for have been patented or disposed of the lease shall not authorize entry thereon, except

[a] Order in Council, March 11th, 1911.

with the written consent of the owner or occupant. In the case of timber license, grazing or coal mining lease, mining claim, or other form of terminable grant which does not contemplate the issue of patent, the permission to enter such land must first be obtained from the Minister of the Interior.

6. In unsurveyed territory application for a lease shall be made in person to the agent or sub-agent of Dominion Lands for that district.

7. The application for a location in unsurveyed territory shall contain a description by metes and bounds for the tract applied for, and shall be accompanied by a plan showing the position of such tract in its relation to some prominent topographical feature. The plan shall contain sufficient data to admit it being definitely shown in the records of the Department. Such tract must be rectangular in form except when bounded by a previously located tract, and the length must not exceed three times the breadth.

The application shall be accompanied by evidence and supported by affidavit to show that the applicant in person has complied with the following requirements:

(a) That the location applied for has been defined by two legal posts numbered 1 and 2. The distance between the posts shall not exceed 15,840 feet, and upon each post shall be inscribed the name of the locator and the date of the location. Upon post No. "1" there shall also be written the words "initial post," the approximate compass bearing of post No. "2," and a statement of the number of feet lying to the right and to the left of the line between Post No. "1" and Post No. "2."

The locator shall, immediately after locating the tract, mark the line between the post by blazing the trees and cutting the underbrush. If the tract is in a locality where there is neither timber nor underbrush, the line shall be marked by earth or stone monuments.

(b) All the particulars placed on the posts shall be set out in the application and shall be accompanied by a plan showing the position of the tract in its relation to some prominent topographical feature.

(c) The locator shall post a written notice on a conspicuous part of the location applied for, setting out his intention to apply within thirty days from the date of such notice for a lease of the petroleum and natural gas rights under the said location.

(d) The application shall be accompanied by evidence supported by the affidavit of the locator, in due form, to show that the above requirements of the regulations have been fully complied with.

8. If the tract is located on the margin of a lake or river, it shall not include more than one mile of water frontage and shall be marked by two posts one at each end of this line. Such claim must be rectangular if possible and not include more than 1,920 acres. Post No. 2 may be

moved by a Dominion Land Surveyor if the distance between the posts exceeds one mile. The side boundaries shall be parallel lines drawn from each end of the front boundary at right angles to the base line of such river or lake. In the event of the base line not being established, the side boundaries of the location shall be drawn at right angles to the general direction of the valley of the river, or the margin of the lake. The required notice of application shall be posted near the margin of the lake or river on which it fronts.

9. Application for lease of the petroleum and natural gas rights under unsurveyed territory shall be made by the locator in person to the district agent or sub-agent of Dominion Lands, within thirty days from the staking if the tract is not distant more than one hundred miles. One extra day shall be allowed for every additional ten miles.

10. In case two persons lay claim to the same location, the lease will be given to the one proving to the Minister that he was the first to stake and that he has complied with the regulations.

11. As soon as the survey of a township has been confirmed, all leases shall be made to conform to the Dominion Lands System of Survey if the Minister so decides.

12. On the confirmation of a township survey, all leases found to be the property of the Hudson's Bay Company shall be withdrawn without compensation to the lessees.

14. Within one year from the date of the lease, the lessee shall have installed prospecting machinery of the value of at least $5,000. If such machinery is not installed in the specified time, the lease shall be subject to cancellation.

15. The lessee shall commence boring operations within fifteen months of the date of his lease, and shall continue such boring with a view to the discovery of oil or natural gas. If boring is not carried on for more than three months, the lease shall be subject to cancellation, in the discretion of the Minister, upon three months' notice to this effect being given to the lessee. Provided, however, that if at least two thousand dollars has been expended in actual boring operations, such expenditure shall be accepted as compliance with this provision for the year during which such expenditure was incurred.

16. The lease shall in all cases include only the oil and natural gas rights which are the property of the Crown, but the lessee may, upon application, be granted a yearly lease at a rental of one dollar an acre per annum, payable yearly in advance, of whatever area of the available

surface rights of the tract described in his petroleum and natural gas lease the Minister may consider necessary for the efficient and economical working of the rights granted him.

17. Should oil or natural gas in paying quantity be discovered on the leasehold, and should such discovery be established to the satisfaction of the Minister, the lessee will be permitted to purchase, at the rate of ten dollars an acre, whatever area of the available surface rights of the tract described in the lease the Minister may consider necessary for the efficient operation of the rights granted.

18. If it is not established to the satisfaction of the Minister that oil or natural gas in paying quantity has been discovered on the leasehold, the lease shall be subject to termination upon two years' notice in writing being given to the lessee by the Minister.

19. The boundaries beneath the surface of a location shall be vertical planes or lines in which their surface boundaries lie.

20. A fee of five dollars shall accompany each application for a lease, which will be refunded if the rights applied for are not available, but not otherwise.

21. The lease shall be in such form as may be determined by the Minister of the Interior, in accordance with the provisions of these Regulations.

22. The lessee shall not assign, transfer, or sub-let the rights described in his lease, or any part thereof, without the consent in writing of the Minister being first had and obtained.

23. No royalty shall be charged upon the sales of the petroleum acquired from the Crown under the provisions of the Regulations up to the 1st day of January, 1930; but provision shall be made in the leases issued for such rights that after the above date the petroleum products of the location shall be subject to whatever Regulations in respect of the payment of royalty that may then or thereafter be made.

24. A royalty at such rate as may from time to time be specified by Order in Council may be levied and collected on the natural gas products of the leasehold.

25. At the end of each year of the term of the lease the lessee shall furnish a statement, supported by affidavit, showing the number of days during the year that operations were carried on upon the location; the number of men so employed; the character of the work done; the depth attained; the total expenditure incurred; a detailed statement setting out fully the purpose for which such expenditure was incurred; the quantity

of crude oil or natural gas obtained, and the amount realized from the sale thereof. Failure to furnish such yearly return will render the lessee subject to a fine of ten dollars a day for each day's delay in furnishing the sworn statement, and after three months' delay the lease shall be subject to cancellation.

Quarrying Regulations

These regulations[a] apply to Manitoba, Saskatchewan, Alberta, North West Territories, the Railway Belt and Peace River Block.

1. Dominion lands containing limestone, granite, slate, marble, gypsum, marl, gravel, sand or any building stone in the aforementioned provinces, may be leased by the Minister at an annual rental of one dollar an acre payable in advance, for the purpose of quarrying out and removing therefrom stone or other material mentioned herein. Provided that no such lease shall convey any right to any other mineral under the land covered by the lease, or any exclusive right with respect to any lake, river, spring or stream within or bordering or passing through the land covered by the lease. These regulations shall not apply to school Lands or to any land comprised within a Dominion Park or Forest Reserve, or to land within an incorporated city, town, or village, unless otherwise specially provided by the Governor in Council.

2. The term of the lease shall be twenty-one years, renewable for a further period of twenty-one years, provided the lessee furnishes evidence, satisfactory to the Minister, to show that during the term of the lease he has complied fully with the conditions of such lease.

3. The maximum area of a quarrying location shall be forty acres, and no person shall be allowed to locate more than one location. Provided, that a lessee who abandons a lease may, after the expiration of twelve months from the date of the lease, be permitted to make another location. Provided further, however, that such right of relocation shall not be granted unless all payments on account of rent, or other liability to the Department, due by such person have been fully made up to the date upon which the notice of his abandonment of the same was received by the Department.

4. In surveyed territory the location applied for shall consist of a legal subdivision or part of a legal subdivision. Provided, that parts of two adjoining legal subdivisions may be included in a quarrying location, but the whole area shall not exceed one-half mile in its greatest dimensions, nor shall the length exceed twice the breadth.

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[a] Approved by Order in Council, dated May 13th, 1910.

5 and 6. Application for a location situated in a surveyed or unsurveyed territory shall be filed by the locator in person with the Agent of Dominion Lands for the district in which the location is situated, within thirty days from the date of staking. If, however, the location is situated more than one hundred miles from the office of the Agent, the locator shall be allowed one additional day for each ten miles, or fraction thereof, in excess of one hundred miles. The application for a quarrying location situated in surveyed territory shall contain a full description by legal subdivisions, or part of a legal subdivision, section, township and range of the land applied for, and shall be accompanied by a declaration to the effect that the location contains, in merchantable quantities, the material of the class applied for by the locator.

7. Application for a stone quarrying location situated in unsurveyed territory shall contain a description by metes and bounds of the location applied for, and shall be accompanied by a plan showing the position of such location in its relation to some prominent topographical feature or other known point. The plan shall contain sufficient data to admit of the position of the location being shown in the records of the Department. The maximum area of the location shall be forty acres and it shall not exceed one-half mile in its greatest dimensions, nor shall the length exceed twice the breadth. The location shall be rectangular, except when bounded by a previous location.

The application shall be accompanied by evidence, supported by affidavit of the locator, to show that the folllowing requirements have been fully complied with.

(a) That the location contains, in merchantable quantities, the material of the class applied for by the locator.

(b) That the location has been defined by placing two legal posts on the ground. The posts being numbered "1" and "2." The distance between the posts shall not exceed 2,640 feet, and upon each post shall be inscribed the name of the locator, date of location, and the class of material which the land contains. Upon post No. "1" there shall also be written the words "Initial Post," the approximate compass bearing of post No. "2" and a statement of the number of feet lying to the right and to the left of the line. The line between the posts shall be marked out by blazing the trees and cutting the underbrush. If the location is not in a timbered district the line shall be marked out by erecting earth or stone monuments.

(c) The application shall set forth all the particulars placed on the posts.

(d) The locator shall post a written notice on a conspicuous part of the location, setting out his intention to apply within thirty days from the date of such notice for a lease of the quarrying rights under the said location.

(e) The application shall be accompanied by evidence, supported by the affidavit of the locator in due form, to show that the above requirements have been fully complied with.

8. Where two or more persons lay claim to the same location, the right to acquire a lease shall be in him who can prove to the satisfaction of the Minister that he was the first to take possession of the tract in the manner prescribed in these regulations, and that he made application for a lease thereof within the specified time.

9. As soon as the survey of a township has been confirmed, all quarrying leaseholds in such township shall, if the Minister so directs, be made to conform to the Dominion Lands system of survey by the substitution of a new lease describing by subdivisions of sections, the tract embraced in the leasehold.

10. As soon as the survey of a township has been confirmed, all quarrying leaseholds shall be subject to the withdrawal forthwith from the lease, without compensation to the lessee, of any portions which are found to be the property of the Hudson's Bay Company. Provided, however, that upon such withdrawal being made from any location in good standing, the rental paid on the land so withdrawn, in whole or in part, may, in the discretion of the Minister, be refunded to the lessee.

11. The lessee shall commence active operations on his leasehold within one year from the date upon which he may be notified by the Minister of the Interior to do so, and shall quarry out or remove the quantity of stone or other material, as the case may be, specified in the said notification. Such notification shall not be given until the expiration of at least one year from the date of the lease. In no case shall the maximum quantity of stone or material required to be taken out exceed five cubic yards per annum for each acre leased. In case operations are not commenced within the time specified in the notice, or if the required quantity of material is not quarried out during each year, the lease shall be subject to cancellation in the discretion of the Minister.

12. The lessee shall not assign, transfer or sublet the rights described in his lease, or any part thereof, without the consent in writing of the Minister being first obtained.

13. The boundaries beneath the surface shall be vertical planes in which their surface boundaries lie.

14. The lease shall be in such form as may be determined by the Minister, in accordance with the provisions of these regulations.

15. A fee of $5 shall accompany each application for a lease which will be refunded if the rights applied for are not available, but not otherwise.

16. The locator shall be given a period of thirty days from the date of the receipt of his application within which to pay to the Agent of Dominion Lands the full amount of the rental for the first year of the term of the lease, at the rate of one dollar ($1.00) per acre, and upon the receipt of such rental, if the application is granted, the lease shall be issued and shall bear date from the day upon which the application was received by the Agent. If the rental is not paid within the time specified, the application shall absolutely lapse, and the right applied for shall become available for other disposition.

17. If, during the term of the lease, the lessee shall fail to pay the rental in advance for each subsequent year, at the rate of one dollar ($1.00) an acre per annum, within thirty days after the date upon which the same became due, the lease shall be subject to cancellation in the discretion of the Minister and to the immediate forfeiture of all rights granted thereunder.

18. A person operating a quarrying location shall furnish the Agent of Dominion Lands for the district in which the location is situated, with sworn returns every six months, or at such times as the Minister may direct, accounting for the full quantity of merchantable stone or other material quarried out or removed from the location.

19. Every lessee of quarrying rights which are not being operated shall furnish the Agent of Dominion Lands with a sworn statement to that effect at least once in each year.

20. In case the surface rights of a quarrying location are covered by a timber license, grazing or petroleum lease, mining claim or other form of terminable grant which does not contemplate the issue of patent, the lease shall not authorize entry thereon except the permission of the Minister is first had and obtained and such permission shall be given subject to such conditions for the protection of the rights of such lessee or licensee as it may be considered necessary to impose.

21. In case the mineral rights in any land comprised within a quarrying location are or have been disposed of by the Crown and the lessee of such mineral rights cannot make any arrangement with the lessee of the quarrying location, or his agent, for entry upon the location, or for the acquisition of such portion of the surface rights as may be necessary for the efficient and economical operation of such mineral rights, he may apply to the Minister for permission to submit the matter in dispute to arbitration. upon receiving such permission in writing it shall be lawful for the lessee of the mineral rights to give notice to the lessee of the quarrying location, or his agent, to appoint an arbitrator to act with another arbitrator named by the lessee of the mineral rights in order to determine what portion of

the surface rights the latter may reasonably acquire for the efficient and economical operation of the rights and privileges granted him under his lease, the exact position thereof, and the amount of compensation to which the lessee of the quarrying location, owner or occupant shall be entitled.

The notice mentioned in this section shall be according to a form to be obtained upon application to the Agent of Dominion Lands, for the district in which the lands in question lie, and shall when practicable, be personally served on such lessee of the quarrying location, or his agent, if known, or occupant, and after reasonable efforts have been made to effect personal service without success, then such notice shall be served, by leaving it at, or sending it by registered mail to the last known place of abode of the lessee of the quarrying location, agent or occupant, and by posting a copy in the office of the Agent of Dominion Lands for the district in which the land in question is situated. Such notice shall be served if the lessee of the quarrying location or his agent resides in the district in which the land is situated, ten days, if out of the district, and if in the province or territory, twenty days, and if out of the province or territory, thirty days, before the expiration of the time limited in such notice. If, within thirty days from the date of the service of such notice, the lessee of the quarrying location, or his agent, or occupant, refuses or declines to appoint an arbitrator or when, for any reason no arbitrator is so appointed in the time limited therefor in the notice provided for by this section, the agent of Dominion Lands for the district in which the lands in question lie, shall forthwith, on being satisfied by affidavit that such notice has come to the knowledge of such lessee of the quarrying location, his agent, or occupant, or that such lessee, agent, or occupant, wilfully evades the service of such notice, or cannot be found, and that reasonable efforts have been made to effect such service and that the notice was left at the last place of abode of such lessee, agent or occupant, appoint an arbitrator on his behalf.

22. In case the two arbitrators cannot agree upon the award to be made, they may, within a period of ten days from the date of the appointment of the second arbitrator select a third arbitrator, and when such two arbitrators cannot agree upon a third arbitrator, the Agent of Dominion Lands for the district in which the land in question is situated, shall forthwith select such third arbitrator.

23. All the arbitrators appointed under the authority of these regulations shall be sworn before a Justice of the Peace to the impartial discharge of the duties assigned to them, and after due consideration of the rights and needs of both lessees, they shall decide as to the particular portion of the surface rights which the lessee of the mineral rights may reasonably acquire for the efficient and economical operation of the rights and privileges grant-

ed him under his lease, the area thereof, and the amount of compensation therefor to which the lessee of the quarrying location or occupant shall be entitled.

24. In making such valuation, the arbitrators shall determine the value of the land irrespective of any enhancement thereof from the existence of minerals therein or thereunder.

25. The award of any two such arbitrators made in writing shall be final, and shall be filed with the Agent of Dominion Lands for the district in which the land is situated, within twenty days from the date of the appointment of the last arbitrator. Upon the order of the Minister the award of the arbitrators shall be immediately carried into effect.

26. The arbitrators shall be entitled to be paid a per diem allowance of $5.00, together with their necessary travelling and living expenses while engaged in the arbitration, and the costs of such arbitration shall be borne by the lessee of the mineral rights.

These regulations shall come into force on the fifteenth day of June, 1910.

YUKON

Yukon Placer Mining Act[a]

15. The Mining Inspector may order any mining work to be so carried on as not to interfere with or endanger the safety of the public or any employees of such mining works, or any public highways or mining property; and any abandoned works may, by his order, be either filled up or guarded to his satisfaction.

2. Any person affected by an order of the mining inspector under this section may, within ten days, appeal therefrom to the Gold Commissioner.

16. The Gold Commissioner, Mining Recorder, Inspector or any person deputed by any one of them, may enter and examine any claim or mine.

Right to Acquire Claim

17. Any person 18 years or over may enter for mining purposes, locate, prospect and mine for gold and other precious minerals or stones upon any lands in Yukon vested in the Crown or otherwise, except lands within the boundaries of a city, town, or village or Indian Reservation, unless under regulations approved by the Governor in Council.

18. Security for damages shall be given before entry can be made on private lands.

19. Owners of claim shall have the first rights to the surface.

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[a] Chap. 64, R.S.C., 1906, as amended by Chap. 54 of 6-7 Ed. VII and by Chap. 77 of 7-8 Ed. VII.

Size and Form of Claim

20. A claim on a creek shall not exceed 500 feet in length measured along the base line of the creek that is established or to be established by a Government survey, as hereinafter provided.

(2) The rear boundaries of claim shall be parallel to the base line, and shall be defined by measuring 1,000 feet on each side of such base line.

(3) In the event of the base line not being established, the claim may be staked along the general direction of the valley of the creek, but in such case, when the base line is established, the boundaries thereby defined shall be conformed to.

21. Claims situated elsewhere than on a creek shall not exceed 500 feet in length parallel to the base line of the creek towards which it fronts, by 1,000 feet in width.

22. A claim fronting on a creek or river shall be staked parallel to the general direction of the creek or river and shall conform to the boundaries which the base line, when established, shall define.

23. Claims are to be measured horizontally.

24. The official base line shall also determine the side lines.

25. Every creek claim shall be rectangular and be marked by two posts in conformity with the law, fixed in the ground on the base line at each end of the claim.

(1) Claims situate elsewhere than on a creek, shall be rectangular and marked by two posts in a line parallel to base line, and on the side nearest the creek or river towards which it fronts.

(2) The line between the two posts shall be well cut out.

(3) One of the flattened sides of each post shall face the claim, and one each post shall be written on the side facing the claim, the name and number of the claim, its length, date of location and the name of locator.

(4) The posts are to be marked Nos. 1 and 2 respectively. No. 2 may be moved by a Dominion Land Surveyor, if the distance between the posts exceeds the length prescribed by this Act, but not otherwise.

(5) Failure to comply with any of the foregoing sections does not invalidate the location, if it appears to the satisfaction of the mining recorder that a *bona fide* attempt has been made to comply with the provisions of this Act, and provided that the non-observance of these formalities does not mislead other persons desiring to locate claims in the vicinity.

26. Any person or party locating the first claim on any creek, hill, bench, bar or plain or locating a claim on any creek, hill, etc., upon which there is no recorded claim, shall be entitled to a claim or claims respectively of the following size, viz:

One locator, one claim 1,500 feet in length.

A party of two locators, two claims each of 1,250 feet in length.

A party of more than two locators, two claims each 1,000 feet in length; and for each member of the party beyond two, a claim of the ordinary size only.

27. A claim granted prior to this Act may by order of the Gold Commissioner be enlarged to the size of a claim granted by this Act if such enlargement does not interefere with the rights of any other person.

Locating and Recording

28. Forms for application for grant, of grant, and of renewal of grant of a claim shall be those contained in schedules A, B and C, of this Act.

29. An application for a grant must be filed within 10 days after locating if it is located within 10 miles of the recorder's office.

(2) One day extra shall be allowed for every additional 10 miles or fraction thereof.

30. No grant will be issued for a part of a claim which is already recorded.

31. Claims staked on a Sunday shall not for that reason be invalid.

32. In the event of claims being more than 100 miles from a recorder's office, and situated where other claims are being recorded, the locators, not less than five in number, are authorized to appoint one of their number an emergency recorder.

33. The emergency recorder shall, as soon as possible, notify the nearest mining recorder of his appointment.

34. Any person going on a *bona fide* prospecting trip may, upon payment of a fee of $2 receive permission to record a claim within 6 months after the staking thereof.

35. Upon application to the mining recorder and by filing the necessary powers of attorney, a person going on a prospecting trip may stake not more than two extra claims.

36. A person may abandon a claim by giving notice in writing to the recorder and surrendering his grant.

(2) No claim shall be re-located within 30 days after its abandonment.

37. Any person having recorded a claim shall not have the right to locate another claim within the same valley within 60 days of the previous location.

38. A substitute mining recorder may act in the absence of the recorder.

Surveys

39. The survey of a claim by a Dominion Land Surveyor shall define all boundaries, provided the returns of the survey are approved by the Commissioner and if notice of such survey has been published in the Yukon Official Gazette for twelve successive issues thereof, and remains unprotested during that period.

Prior to such advertisement in the Official Gazette the owner shall post upon the claim the surveyor's plan and a notice of his intention to advertise the survey of the claim.

All protests of the survey shall be decided by the Gold Commissioner.

The owner may have the claim re-surveyed at his own expense when the decision varies the boundaries.

An appeal may be taken at any time within twenty days from the decision of the Gold Commissioner to the Court *en banc* of the Territorial Court of the Yukon Territory.

40. The Commissioner may authorize the survey of the base line of any creek, and the side lines of any claim located on a creek or river. Such survey shall be subject to the provisions of section 39 of this Act with respect to advertisement and protest.

Title

41. Any person having located a claim may obtain a grant thereof for one or five years by paying in advance the fees prescribed in schedule D.

(2) After the five years, grants may be renewed from year to year, provided that work to the value of $200 is done and recorded on the claim each year.

(3) An affidavit stating that such work has been done shall be filed within 14 days after the expiration of the grant. The work done outside of a claim, if it has a direct relation to the claim, may be accepted as work done on the claim.

42. The claim shall be forfeited if the work is not done.

43. When an owner does not renew the grant, the claim may be re-located. Provided that if the work has been done the owner may renew the grant within 6 months and apply for the cancellation of the re-location: but in that case the owner must re-imburse the re-locator for all expense that such locator has been put to and must pay the recorder a renewal fee of $30 if application is made within 3 months, or $45 if application is made during the second three months.

44. Except by leave of the Commissioner the contestation of a title can only be made by one having an adverse claim.

45. Co-owners on the claim must contribute in proportion to their interests towards the expense attached to performing the necessary work required by this Act.

46. The owner of a claim may sell or dispose of a claim but all transfers, mortgages, etc., must be recorded.

47. No agreement affecting the title to any claim shall be enforceable without notice, unless such agreement is recorded.

48. A person receiving a grant of a claim or having the permission to record a claim within 6 months has the right, during the continuance of his grant or permission, to fish and shoot and cut timber (if not otherwise acquired) for his own use; and shall also have the exclusive right to enter and mine upon such claim.

49. The rights of an owner shall not be affected by the neglect or omissions of any official appointed under this Act.

Grouping

51. Any person or persons, not exceeding ten in number, owning adjoining claims may upon application to a Mining Recorder obtain permission for a term of years, not exceeding ten, the right to perform on any one or more claims all the work required to entitle him or them to a renewal of grant; provided that a deed of partnership of joint liability be recorded between the owners of the claims.

(2). If such application is made for more than ten claims, either adjoining or not all contiguous, the Commissioner, after receiving the report of the government engineer, may grant the permission as prescribed in the preceding section.

52. Grants of grouped claims may be renewed on the same day.

Water Rights

53. A claim owner is entitled to the seepage water on the claim and to use so much of the water flowing past his claim and not already appropriated, as, in the opinion of the Mining Inspector is necessary for working the claim; and he shall be entitled to drain his own claim free of charge.

54. The Mining Recorder with the approval of the Commissioner may grant to a claim owner the right to divert for five years, water from any stream or lake and the right of entry upon any mining ground for the purpose of conveying such water; provided that security is given to cover any damage caused by such entry.

55. Every applicant for a water grant shall post for twenty days previous to the making of the application a notice in writing of his intention to apply to the Mining Recorder for such grant

(a) At the point of proposed diversion.

(b) On the claim on which such water is intended to be used.

(c) On each person's land to be crossed by the water in the course of transit; and

(d) In the office of the Mining Recorder; and shall forward a copy of such notice to the Gold Commissioner.

(2) Such notice shall state:

(a) Name of applicant.

(b) Name or description of the stream, lake or other source from which water is intended to be diverted or taken.

(c) The point of diversion, and the point where the water is to be returned to the stream.

(d) The means by which it is intended to divert or take, or store the water.

(e) The number of inches of water to be applied for.

(f) The purposes for which it is required.

(g) The claim upon which the water is to be used, or if the right to sell water is asked, the locality within which the right is to be exercised; and

(h) The date of the posting of the notice, and the date on which application will be made to the Mining Recorder for the granting of the record.

56. On the day mentioned in the notice of application or at a subsequent time application shall be made by or on behalf of the applicant, either in person or in writing for a grant in accordance with the terms of the notice.

59. The holders of a water grant shall not waste the water, and are subject to a reduction of the water grant in case of waste or excess.

60. Every grant of water on an occupied creek shall be subject to rights of such claim owners as shall, at the time of such grant, be working on the stream above or below the ditch-head, and of any other persons lawfully using such water for any purpose whatsoever.

61. If, after the grant has been made, any persons locate and begin to work any claim below the ditch head on any creek so diverted, they shall collectively be entitled to the continuous flow in the said stream of the water passing such claims to the following extent: if 300 inches or less are diverted, they shall be entitled to 40 inches; if over 300 inches, to 60 inches and no more, except in either case by paying compensation to the owner of the ditch for the amount of damage caused by the extra flow of water.

(2) The right to such extra flow shall be subject in all cases to the approval in writing of the Government mining engineer.

62. The price of sale of diverted water is controlled by the Commissioner.

63. Measurement of water:

(a) The water taken into a ditch or sluice shall be measured at the ditch or sluice head.

(b) No water shall be taken into a ditch except in a horizontal trough.

(c) One inch of water means half the quantity of water flowing through a rectangular orifice two inches high by one inch wide under a constant head of seven inches above the upper side of the orifice.

(d) A sluice head shall consist of fifty such inches of water.

64. The owner of a ditch shall construct all necessary culverts.

65. Ditches shall be kept in good repair so as not to cause damage to other property.

67. A transfer of a claim shall also include the water privileges.

67A. The Commissioner may grant a reservoir site upon ground worthless for mining purposes.

Drainage

68. The Mining Recorder may grant permission to run a drain or tunnel for drainage purposes over any occupied or unoccupied land for a term not exceeding five years.

69. The grantee shall compensate the owners of such land for any damage done by such tunnel or drain.

70. Such drains or tunnels shall be deemed the property of the constructor.

Disputes

73. The title of the claim depends on the priority of the location.

75. No person shall injure another claim by dumping tailings, pumping water, etc., on such other claim.

Taxation and Fees

85. A royalty of two and one-half per cent must be paid on all gold shipped from Yukon (based on gold worth $15 per ounce).

87. All fees, royalties, etc., shall become part of the Consolidated Revenue Fund of Canada.

General Regulations

90. No person shall acquire a claim except in accordance with this Act; provided that this section shall not affect any rights which:

(a) Have already been acquired under the regulations for the disposal of mining location in the Territory to be worked by the hydraulic or other mining process approved by Order in Council of Dec. 3rd, 1898, and amendments thereto, or

(b) Have been or may be acquired under the regulations governing the issue of leases to dredge for minerals in the beds of rivers in the Territory

approved by Order in Council on Jan. 18th, 1898, or any amendments of such regulations.

SCHEDULE "D"

Scale of Prices to be Charged

For grant of a claim for one year	$10.00
For grant of a claim for five years	50.00
For renewal of grant of a claim	10.00
Recording an abandonment	2.00
Registration of a document	2.00
If it affects more than one claim, for each additional claim	1.00
For filing any document	1.00
Abstract of title—	
For first entry	2.00
Each additional entry	0.50
For copy of document—	
Up to 200 words	2.50
For each additional 100 words	0.50
For grant of water—	
Of 50 inches or less	10.00
From 50 to 200 inches	25.00
From 200 to 1,000 inches	50.00
For each additional 1,000 inches or fraction thereof	50.00

Yukon Dredging Regulations

The following regulations[a] govern the issue of leases to dredge for minerals in the submerged beds of rivers in Yukon

1. For the purposes of these regulations, "Minister" means the Minister of the Interior, "River" means a stream of water the bed of which is of an average width of one hundred and fifty feet throughout the portion thereof sought to be leased. The Gold Commissioner shall be the judge as to whether or not any stream in connection with which dredging applications have been made is sufficiently large to be considered a river within the meaning of these regulations;

"River Bed" means the bed and bars of the river to the foot of the natural banks.

2. The Minister may issue leases granting the exclusive right to dredge for gold, silver and platinum in the bed of any river in Yukon.

[a] Order in Council dated the 14th day of May, 1907.

3. The length of river to be included in any lease shall be continuous, and shall in no case exceed ten miles measured along the middle of the river following its sinuosities.

4. Every lessee under these regulations, or under the regulations hereby rescinded, shall have the exclusive right to dredge the river bed within the length of river leased to him.

5. Not more than one lease shall be issued in favour of one person.

6. The lessee shall, when so directed by the Minister, cause a survey to be made, at his own expense and in accordance with the instructions of the Surveyor General, of the extent of river leased to him, and the returns of such survey shall be filed in the Department of the Interior within six months after receipt by the lessee of such direction and instructions.

7. The lease shall be for a term of fifteen years, at the end of which time all rights vested in or which may be claimed by the lessee under his lease shall cease and determine. The lease may be renewable, however, from time to time at the discretion of the Minister, provided it is shown to his satisfaction that the leasehold has not been fully mined; that the lessee has, during the term of his lease, efficiently operated the leasehold; and that he has otherwise complied fully with the provisions of the regulations in that behalf.

8. The lessee shall not assign his lease, nor transfer or sub-let the demised premises or any portion thereof, without the consent in writing of the Minister.

9. Every lease shall be deemed to be issued subject to the rights of all persons who received entries for claims under the provisions of the Yukon Placer Mining Act, or under former regulations, prior to the issue of such lease.

10. The lessee shall, within three years from the date of his lease, have at least one dredge, of such capacity as the Minister may deem sufficient, in operation upon the leasehold, and shall furnish proof of the efficient operation of such dredge for not less than forty days of ten hours each, in every year after the third year from the date of the lease. Unless such proof is furnished yearly, or at such times as the Minister may direct, the Minister may declare the lease to be null and void.

11. The lessee shall pay for the first year a rental of $100 for each mile of river leased to him, and for each subsequent year a rental of $10 for each mile.

12. The same royalty shall be paid upon gold mined under a dredging lease as is paid from time to time upon gold mined from ordinary placer mining claims.

13. The lessee may obtain from the Crown Timber Agent a permit or permits to cut, free of dues, such timber as may be necessary for the purposes of his mining operations. Such permit or permits shall contain a description of the tract or tracts within which the timber may be cut, and the kind, dimensions and quantities of timber to be so cut. Such permit, however, shall not give or be deemed to give to the holder thereof any exclusive right to the timber on the tract described therein.

14. The lessee shall not interfere in any way with the general right of the public to use for navigation or other purposes the river upon which he holds a lease. The free navigation of a river shall not be impeded by the deposit of tailings, and the current or stream shall not be obstructed in any material degree by the accumulation of tailings. If the lessee fails to observe this condition of his lease, notice may be posted by such officer as the Minister directs at the point where the stream has been impeded or obstructed or in the vicinity thereof, requiring such defect to be remedied, and a copy of such notice shall be served upon the lessee or his agent. Failure to remove, within the time set out in the said notice, the impediment or obstruction complained of, or the continuance of such impediment or obstruction, may be punished by a fine or by the cancellation of the lease as the Minister directs.

15. The lease shall provide that any person who has received or who may receive entry under the Yukon Placer Mining Act or former regulations shall be entitled to run tailings into the river at any point thereof and to construct all works which may be necessary for properly operating his claim, provided that it shall not be lawful for any such person to construct a dam or wing-dam within 1000 feet from the place where any dredge is being operated or to obstruct or interfere in any way with the operation of any dredge.

16. The lease shall reserve all roads, ways, bridges, drains and other public works and all duly authorized improvements now existing or which may hereafter be made in, upon, or under any part of the river, and the power to enter and construct the same, and shall provide that the lessee shall not damage nor obstruct any public or duly authorized ways, drains, bridges, works and improvements now or hereafter to be made upon, in, over, through or under the river, and that he will substantially bridge or cover and protect all the cuts, flumes, ditches and sluices and all pits and dangerous places at all points where they may be crossed by a public highway or frequented path or trail to the satisfaction of the Minister.

17. These regulations shall not restrict any rights which have been granted under former regulations.

ALBERTA

Tar-Sand Regulations

The following regulations govern the disposal of the tar-sands, the property of the Crown, in that portion of the province of Alberta lying north of Township 80, and between the 4th and 5th initial meridians[a] (Sec. p. 277).

1. The tar-sand deposits which are the property of the Crown in that portion of the province of Alberta lying north of Township 80, and between the 4th and 5th initial medidians, may be leased to applicants for a term of twenty-one years at an annual rental of fifty cents an acre, payable yearly in advance. The term of the lease shall be twenty-one years, renewable for a further term of twenty-one years, provided the lessee can furnish evidence satisfactory to the Minister[b] to show that during the term of the lease he has complied fully with the conditions of such lease, and with the provisions of the Regulations under which it was granted. In case the surface rights of the lands have been disposed of, application for a lease of the tar-sand rights will not be entertained.

2. No applicant shall be allowed to lease more than an area of 1,920 acres.

3. The tract applied for, if situated in surveyed territory, shall consist of sections, or legal subdivisions of sections; but the several parcels comprising the tract must be contiguous, and the whole area applied for shall not exceed three miles in its greatest dimension. In unsurveyed territory, if the tract applied for is so situated as to admit of a definite description by sections, and legal subdivisions of sections, being furnished, that is, if at least one line bounding each section or part of a section applied for has been surveyed, and such survey duly approved, an application for the tar-sand rights may be considered under the provisions of this section.

4. Applications for such tar-sand rights shall be filed by the applicant in person with the Agent of Dominion Lands for the district in which the rights applied for are situated, or with a sub-agent for such district, for transmission by the agent to the Department of the Interior; but priority of application shall be based upon the date of the receipt of such application in the office of the Agent of Dominion Lands for the district. The application shall contain a description by section, part of section, township and range of the tract applied for.

5. If the tar-sand rights which an applicant desires to lease are situated in unsurveyed territory, application therefor shall be filed with the Agent of Dominion Lands for the district in which the rights applied

[a] Order in Conncil, dated the 14th of February, 1910.
[b] Minister of the Interior.

for are situated, or with a sub-agent for such district, for transmission by the Agent to the Department of the Interior.

6. The application shall contain a description by metes and bounds of the tract applied for and shall be accompanied by a plan showing the position of such tract in its relation to some prominent topographical feature or other known point. The plan shall contain sufficient data to admit of the position of the tract applied for being definitely shown in the records of the department. Such tract must be rectangular in form, except where a boundary of a previously located tract is adopted as common to both locations, the length not to exceed three times the breadth.

The application shall be accompanied by evidence supported by affidavit to show that the following requirements have been fully complied with by the applicant in person, and not through another:—

(*a*) That the tract applied for has been duly defined on the ground by planting a wooden post at least four inches square, and standing not less than four feet above the ground, at one angle or corner of the said tract.

(*b*) Upon such post shall be inscribed the name of the applicant, the date of the location, the angle represented by the posts, the length and direction of the boundaries of the tract applied for. Thus: A. B.'s tar-sand location N.E. corner (meaning the northeast corner), this claim extends three miles west and one mile south from this post, or as the case may be.

(*c*) That a written or printed notice has been posted on a conspicuous part of the tract applied for, setting out the intention of the applicant to apply, within thirty days from the date of such notice, for a lease of the tar-sands upon or under the said tract.

In case the tract applied for is located on the margin of a river or lake it shall not include more than one mile in direct distance along such water frontage, and shall be marked on the ground by two legal posts firmly fixed in the ground, one at each end of such front boundary. Parallel lines shall be drawn from each end of the front boundary at right angles thereto if possible, and extended back as far as may be necessary to include a total area of not more than 1,920 acres. The posts shall be numbered 1 and 2, respectively. It shall not be lawful to move post No. 1; but No. 2 post may be moved by a Dominion Lands Surveyor if the distance between the posts exceeds the length prescribed by these Regulations, but not otherwise. The required notice of application shall, in such case, be posted conspicuously on the location near the margin of the river or lake on which it fronts.

7. Application for a lease of the tar-sand rights under lands situated in unsurveyed territory shall be made by the locator in person to the Agent of Dominion Lands for the district in which the tract applied for is situated, or with the sub-agent for such district, within thirty days

from the date upon which the tract applied for was located, if it is situated within one hundred miles of the office of the agent, otherwise is will not be considered. One extra day, however, shall be allowed for every additional ten miles or fraction thereof that the location is distant more than one hundred miles from the office of the agent.

8. Where two or more persons lay claim to the same location, or to portions of the same locations, the right to acquire a lease shall be in him who can prove to the satisfaction of the Minister that he was the first to take possession of the tract in dispute by demarcation in the manner prescribed in these Regulations, and that he made application for a lease thereof within the specified time.

9. The lease shall bear date the day upon which the application was filed in the office of the Agent of Dominion Lands, and the rental for the first year shall be paid within thirty days from such date otherwise the application will absolutely lapse and the rights applied for shall become available for other disposition. If during the term of the lease the lessee shall fail to pay the rental in advance within thirty days from the date upon which the same becomes due, the lease shall be subject to cancellation in the discretion of the Minister, and to the immediate forfeiture of all the rights which the lessee had in the said lease.

10. As soon as the survey of a township has been confirmed, all tar-sand leases embracing any portion of such township so surveyed and confirmed, shall be made to conform to the Dominion Lands System of Survey if the Minister so decides, by the substitution of a new lease describing by sections, legal subdivisions of sections, or regular portions of legal subdivisions, as nearly as may be the tract embraced in the leasehold in so far as the township so surveyed is concerned. If any part of the leasehold is in territory which remains unsurveyed, it shall continue to be described as in the lease originally issued, until such portion is included in a confirmed survey.

11. The lease shall include the tar-sand rights only; but the lessee may, upon application, be permitted to purchase at the rate of ten dollars an acre whatever area of the available surface rights thereof the Minister may consider necessary for the efficient and economical working of the tar-sand rights granted under such lease.

No portion of the surface rights of a tar-sand location shall be granted to any person other than the lessee thereof until such lessee has been given an opportunity of acquiring the said rights, by notice in writing from the proper officer of the department.

12. The lessee shall commence active operations on his leasehold within one year from the date upon which he may be notified by the proper officer of the Department of the Interior to do so, and shall produce from such operations the quantity of material specified in the said notification. Such notification shall not be given until the expiration of at least one year from the date of the lease, and shall set out the quantity of tar-sand which the lessee is required to excavate and produce ready for shipment or treatment, which quantity, however, may be increased by notification from time to time; but in no case shall the maximum quantity required to be excavated exceed ten tons per annum for each acre leased. In case operations are not commenced within the time specified in the notice, or if the required quantity of material is not mined during each year, the lease shall be subject to cancellation in the discretion of the Minister.

13. During each of the first three years of the term of the lease, however, the lessee shall be required to make such expenditure in the development of his leasehold, and in the installation of a plant and other appliances and equipment necessary for its efficient operation as may be prescribed in the lease, and he shall furnish evidence at the end of each such year to the satisfaction of the Minister that such expenditure has been incurred for the purpose and in the manner specified. In case satisfactory evidence is not furnished to show conclusively that the required expenditure has been incurred during each of the first three years, the lease shall be subject to immediate cancellation in the discretion of the Minister.

14. The lessee shall not assign, transfer, or sublet the rights described in his lease, or any part thereof, without the consent in writing of the Minister being first had and obtained.

15. The boundaries beneath the surface of a location shall be vertical planes or lines in which their surface boundaries lie.

16. A fee of five dollars shall accompany each application for a lease, which will be refunded if the rights applied for are not available, but not otherwise.

17. The lease shall be in such form as may be determined by the Minister of the Interior, in accordance with the provisions of these Regulations.

18. No royalty shall be charged upon the products of any tar-sand location granted under these Regulations, or on the sales of the products of such location up to the 1st day of January, 1930; but provision shall be made in the lease issued for such location that after the above date, the products of the location shall be subject to whatever Regulations in respect of the payment of royalty may then or thereafter be made.

DOMINION FOREST RESERVES

Coal Mining

The following regulations[a] govern the disposal of Coal Mining Rights, the property of the Crown, within reserves set apart by the Dominion Forest Reserves Act and within the Jasper Forest Park of Canada.

1. No lease for coal mining purposes shall entitle the lessee to purchase the surface rights; but the lessee may, upon application, be granted a lease concurrent with that for the coal mining rights, for such portion of the surface rights thereof as the Minister of the Interior may consider necessary for the efficient and economical working of the coal mining rights granted under such lease.

2. That the lessee will do no unnecessary damage to timber and will carefully observe all the provisions of all regulations relating to forest reserves.

3. That no trees on the reserve will be cut by him without the permission of the Superintendent of Forestry, and that when any trees are cut by him he will carefully clear the ground of all tops and branches and other debris of such cutting, and will so dispose of them as to prevent danger from fire, in accordance with the instructions of the officer in charge of the reserve. If in order to so dispose of such debris it is necessary to burn it, the lessee shall give due notice of his intention so to do to the officer in charge of the reserve, and before he proceeds to burn such debris shall obtain the consent of such officer, and shall comply with all the conditions imposed by such officer in regard to such burning.

4. That the lessee shall clear and at all times keep clear of inflammable material a space of at least one hundred feet in width surrounding his works or operations.

5. That any engine operated by power of steam used by him in connection with his works or operations shall be fitted with efficient spark arresters, which shall at all times be kept in a state of good repair.

Quartz Mining Regulations

The following Regulations[b] govern the disposal of quartz mining claims within reserves set apart by the Dominion Forest Reserves Act and within the Jasper Forest Park of Canada.

By an Order in Council, dated the 16th of February, 1909, the regulations for the disposal of Dominion Lands for quartz mining purposes, as provided by Order in Council of the 13th of August, 1908, were made to

[a] Orders in Council, 28th, Feb. and 11th, March, 1911.

[b] Orders in Council 18th January and the 16th February, 1909.

apply to lands within the tracts set apart by the Dominion Forest Reserves Act, with the following restrictions:

1. That a Crown Grant shall not be issued for a mineral claim situated within the limits of a forest reserve; but the holder of a mineral claim so situated, who has complied fully with those requirements of the Quartz Mining Regulations which precede the issue of a Crown Grant, shall be entitled to a lease of the surface and mineral rights of the claim in connection with which such requirements have been fully complied with, or a lease of the mineral rights and of such of the surface rights as the Minister of the Interior may consider necessary for the efficient and economical working of the mineral rights granted under such lease.

2. That the term of the lease shall be twenty-one years, renewable for further terms of twenty-one years in each case, provided satisfactory evidence is submitted to show that the lessee has complied fully with the conditions of his lease and the provisions of the regulations.

3. That the grantee or lessee of a mineral claim shall do no unnecessary damage to timber and will carefully observe all the provisions of all regulations relating to forest reserves.

4. That no trees on the reserve shall be cut by him without the permission of the Superintendent of Forestry, and that when any trees are so cut, he shall carefully clear the ground of all tops and branches and other debris of such cutting, and shall so dispose of them as to prevent danger from fire in accordance with the instructions of the officer in charge of the reserve. If, in order to dispose of such debris, it is found necessary to burn it, the lessee of the claim shall give due notice of his intention to do so to the officer in charge of the reserve, and before he proceeds to burn such debris, shall obtain the consent of such officer, and shall comply with all the conditions imposed by such officer in regard to such burning.

5. That the lessee shall clear, and at all times keep clear of inflammable material, a space of at least one hundred feet in width surrounding his works or operations.

6. That any engine operated by the power of steam used by him in connection with his works or operations, shall be fitted with efficient spark arresters which shall at all times be kept in a state of good repair.

By an Order in Council, dated the 18th of January, 1909, the Quartz Mining Regulations with the restrictions contained in Order in Council of the 16th of February, 1909, were made to apply to the disposal of lands in the Jasper Forest Park of Canada, for quartz mining purposes.

Rocky Mountains Park Coal Lands

The regulations[a] respecting the issue of leases to mine for coal on lands situated within the Rocky Mountains Park of Canada, are as follows:

[a] Order in Council of Dec. 10, 1907: amended by Order in Council of Feb. 16, 1909.

1. Leases to mine coal from lands within the Rocky Mountains Park may be issued by the Minister of the Interior.

2. Such applications for leases shall be filed with the Superintendent of the Park for transmission to the Department of Interior; but priority of application shall be based upon the date of the receipt of such application in the office of the Superintendent.

3. The application for a lease in surveyed territory shall contain a description by section, part of section, township and range of the tract applied for. In unsurveyed territory, if the tract applied for is so situated as to admit of a definite description by sections, and regular portions of sections being furnished, an application may be considered under this provision.

4. Application for coal mining rights in an unsurveyed portion of the Park shall be filed with the Superintendent of the Park for transmission to the Department of the Interior. The total length of the tract shall not exceed 10,560 feet and the length shall not exceed four times the breadth. All angles shall be right angles, except where the boundaries are interfered with by previous locations, but the boundaries need not be due North and South and due East and West.

5. The tract shall be marked by two wooden posts, marked Nos. 1 and 2, at least four inches square and four feet high, placed on the base of the seam. The distance between the posts shall not exceed 10,560 feet. The name of the applicant and date of the location shall be inscribed upon the posts. Upon No. 1, shall be marked "Initial Post," and the approximate compass bearing to No. 2, together with a statement of the number of feet lying to the right and to the left of the line between the Posts Nos. 1 and 2.

6. After locating, the applicant shall distinctly mark the line between the posts by cutting out the line, blazing the trees or erecting monuments.

7. All particulars placed on the posts shall be set out in the application, and shall be accompanied with a plan showing the position of the tract with its relation to some prominent topographical feature in order that such tract may be definitely shown on the records of the Department of the Interior.

8. A written or printed notice shall be posted on a conspicuous part of the tract applied for, setting out the intention of the applicant to apply within thirty days from the date of such notice for a lease of the coal mining rights under the said tract.

9. The application shall be accompanied by evidence, supported by affidavit, in due form, to show that the above requirements of the regulations have been fully complied with.

10. Application for lease in unsurveyed territory shall be filed within thirty days after location.

11. Where two or more persons lay claim to the same location, the right to acquire a lease shall be given to the first locator.

12. All applications for lease shall be accompanied by a fee of $5. If the rights applied for are not available, such fee will be refunded.

13 The duration of a lease shall be for 20 years unless terminated by the consent of the Crown and the lessee or cancelled for non-fulfilment of conditions, and it shall be renewable in the discretion of the Governor-General in Council for further periods of 20 years each, not exceeding in all sixty years, on such terms and conditions as may at the time of renewal be agreed upon by the Government and the lessee.

14. The ground rent shall be at the rate of $1 per acre per annum, payable half-yearly in advance.

15. The lessee shall commence active operations on the lands described in his lease within one year from the date upon which he may be notified by the proper officer of the Department of the Interior to do so, and shall produce from such operations the quantity of coal specified in the said notification. Such notification shall not be given until the expiration of at least one year from the date of the lease, and shall set out the quantity of coal which the lessee is required to mine and produce at the pit's mouth ready for shipment, which quantity, however, may be increased by notification from time to time, but in no case shall the maximum quantity required to be mined exceed ten tons per annum for each acre leased. In case operations are not commenced within the time specified in the notice, or if the required quantity of coal is not mined during each year, the lease shall be subject to cancellation in the discretion of the Minister.

16. The lessee shall not assign, transfer or sub-let the rights described in his lease, or any part thereof, without the consent in writing of the Minister being first had and obtained.

17. The boundaries beneath the surface of coal mining locations shall be the vertical planes or lines in which their surface boundaries lie.

18. In addition to the rent, a royalty, at the rate of five cents per ton of two thousand pounds, will be levied and collected on the merchantable output of the mine, and it will be necessary for the lessee to furnish sworn returns monthly or at such times and in such manner as the Minister of the Interior may direct, accounting for the full quantity of merchantable coal mined, and pay the royalty thereon at the above rate.

19. Default in payment of the royalty, or in furnishing the returns, if continued for thirty days after notice has been posted at the mine, or conspicuously on the property in respect of which it is demanded, by the Superintendent of the Park or by his direction, may be followed by cancellation of the lease, or the imposition of a fine in the discretion of the Minister of the Interior.

20. Any attempt to defraud the Crown by withholding any part of the revenue thus provided for, by making false statements of the amount taken out, may, in the discretion of the Minister, be punished by fine, or by the cancellation of the lease in respect of which fraud or false statement has been committed or made. In respect to the facts as to such fraud or false statements or non-payment of royalty or failure to furnish returns, the decision of the Minister of the Interior shall be final.

21. The area to be leased to one person shall not be less than 160 acres, and shall not exceed 640 acres.

22. The lease shall be subject to the general regulations for the control and management of the Rocky Mountains Park of Canada, dated the 30th of June, 1890, and to such further and other regulations as have since been made or which may be hereafter made from time to time in that behalf by the Governor-General in Council.

23. The lease shall be in such form as may be determined by the Minister of the Interior, in accordance with the provisions of these regulations.

Provincial Acts

Alberta

The Coal Mines Act[a]

2. This Act applies to coal mines, mines of stratified ironstone, shale and fireclay.

Employment of Persons in Coal Mines

5. The manager of every mine shall keep a register of the employees.

6. No boy under sixteen shall be permitted to work underground.

2. No boy above the age of twelve and under sixteen shall be permitted to work above ground unless he can read and write and furnish a certificate from a school teacher to that effect.

5. No boy under twelve, or woman or girl, shall be employed in the workings of any mine.

9. Failure to comply with the registration or employment regulations shall be an offence against this Act.

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[a] Chap. 25 Statutes of Alberta 1906, as Amended by Chap. 20 Stat. of Alberta, 1908.

Single Shafts

10. (a) There shall be two shafts or outlets communicating with every seam being worked.

(b) Such shafts shall not be nearer to each other than 100 feet.

(c) Proper apparatus for raising and lowering persons shall be kept available for use at each shaft.

12. The foregoing provisions of this Act shall not apply in the case of a new mine being opened:

(a) To any working for the purpose of making a communication between two or more shafts, or

(b) To any working for the purpose of searching for minerals so long as not more than twenty persons are employed below ground; nor

2. To any proved mine where the outlay would cause the mine:

(a) To shut down, or

(b) Where the workings have reached the boundary and on withdrawing the pillars one shaft has been cut off provided there are not more than twenty persons employed underground; nor

3. To any mine:

(a) While a shaft is being sunk or an outlet made; or

(b) One of the shafts or outlets has become unavailable provided the mine is exempted by order of the Minister.

Certificated Managers and Officials

13. Every mine shall be under the control and supervision of a manager. The name and address of such manager shall be sent to the Minister and district Inspector.

2. The underground workings of every mine shall be under the daily charge of a pit boss holding a certificate under this Act.

3. A manager must hold a certificate under this Act.

4. If a mine be worked for more than thirty days without such a manager, the owner shall be guilty of an offence against this Act, provided that the owner or agent shall not be guilty if he has taken all reasonable means to prevent the mine being worked in contravention thereof; and

If no certificated manager can be had the pit boss holding a certificate under this Act may be appointed as manager for a period of not more than thirty days.

A mine employing less than twenty persons shall be exempted from having a manager, provided a pit boss takes charge below ground and a manager is not required by the Inspector's orders.

14. A manager or pit boss may have his certificate cancelled for negligence.

18. Certificates of competency for managers shall be issued by the Minister upon the report of the board of examiners.

Board of Examiners

19. The Board of examiners is appointed by the Lieutenant-Governor in Council.

2. Such board in each district shall consist of

(a) The provincial Inspector of Mines.

(b) One manager of mines.

(c) One working miner.

3. For the purpose of this section, the Province shall be divided into three districts called respectively Crowsnest, Canmore and Edmonton districts.

20. Each board of examiners shall draw up a set of rules.

24. A candidate for a mine manager's certificate must have had at least five years' practical experience in a mine or be a graduate in mining of a university, have had three years' practical experience in a mine, and be at least 23 years of age.

(b) If he is a candidate for a pit-boss or fire-boss certificate, he must have had at least three years' practical experience in a coal mine and be at least 23 years of age.

Pit Boss and Fire Boss

25. Certificates are given to pit- or fire-bosses on passing the necessary examinations.

26. Returns of certificates issued must be made to the Minister.

27. No person shall be employed in any mine as a shotlighter unless he holds a certificate of competency as fire-boss.

28. Pit-bosses, shotlighters or fire-bosses must hold certificates.

29. Superior class certificates include inferior class certificates.

Payment of Wages

30. No wages shall be paid in a public-house or saloon.

31. If men are paid according to the weight of mineral mined, such mineral must be weighed at the mine mouth or as near as is reasonably practicable.

(2) Owner may deduct for stone in the coal, if it is so agreed.

(3) If such deductions are not mutually agreed they shall be determined:

(a) In any special manner agreed upon between the manager and men.

(b) By some person appointed by the manager and by a person appointed by the employees or,

(c) If the persons so appointed disagree, a third person shall be appointed, or if they disagree upon such appointment the Minister may appoint a person.

33. A check-weigher may be appointed by the men at their own cost to weigh the coal as a check on the mine weighman.

34. The check-weigher shall not interfere with the working of the mine.

Returns and Notices

39. The manager of every mine shall on or before the 21st of January in every year send to the Minister correct returns for the preceding year, stating the amount of coal or other mineral mined, average number of persons employed in or about the mine together with such information as may be required by the forms prescribed by the Minister for making such returns.

40. Immediately after an explosion or accident the manager must send notice by telegram to the Inspector and Minister if there is loss of life and specify the character of the explosion or accident and the number of persons killed and injured, and within 24 hours must fill out and send the accident or explosion form given in schedule "A." In the case of an accident which has not resulted fatally, the notice may be sent in writing.

41. All changes in the management, in the name of the mine, and in the workings, must be reported to the Minister.

Abandoned Mines

42. Notice of abandonment of mine must be given and in that case all shafts or openings shall be fenced.

43. A plan on a scale not less than one hundred feet to one inch, showing the boundaries of the workings must be sent to the Minister within three months after such abandonment.

Inspection

44. Mine Inspectors are appointed by the Lieutenant-Governor in Council.

45. An Inspector must visit every mine in his district as often as his duties will permit and shall make an annual report to the Minister.

46. The Inspector shall have the following powers:

(a) To ascertain if the provisions of this Act are complied with.

(b) To enter, inspect and examine any mine at all reasonable times by day or night.

(c) To examine into the state and condition of any mine, its ventilation, and the sufficiency of any special rules for the time being in force in the mine and all matters and things connected with or relating to the safety of the persons employed in or about the mine.

(d) To exercise such powers as are necessary for carrying out this chapter.

Every person obstructing the inspector in the execution of his duties shall be guilty of an offence against this Act.

Immediately after the completion of each inspection the District Inspector shall cause the synopsis of his report to be posted in a conspicuous place at the mine.

47. An accurate mine plan must be kept in the mine office, showing the workings up to at least six months previous.

48. If the Inspector finds any mine dangerous or defective he shall notify the manager and require the same to be remedied; and unless the same is remedied the Inspector shall report the same to the provincial Inspector.

(2) If the manager objects to remedying the matter, he may within ten days send his objections in writing to the Minister. The matter shall then be settled by arbitration.

49. In the case of any accident in the mine, the Minister may direct the Inspector to conduct a formal investigation.

Coroner's Inquest

50. In the case of an inquest on the body of any person whose death may have been caused by an explosion or accident the Coroner shall notify the District Inspector and in the case of the non-arrival of the Inspector, the Coroner shall adjourn the inquest to enable the Inspector or his agent to be present.

(2) The coroner must give the Inspector or Minister four days' notice before holding the inquest.

(4) The Inspector or other persons so appointed may examine any witness.

General Rules

The following general rules shall be observed so far as is reasonably practicable in every mine:

1. (a) The mine must have an adequate amount of ventilation.

(b) An adequate amount of ventilation shall mean not less than 100 cu. ft. of fresh (pure) air per minute for each man, boy, horse or mule employed in the mine, or as much more as the District Inspector may direct. Every mine shall be divided into splits of not more than 70 men in each, and each split or district shall be supplied with fresh air. If so ordered by the District Inspector, there shall be two doors on all roadways.

(c) The amount of ventilation passing through the mine shall be measured each week by the pit boss and the results recorded.

(d) Mines employing less than fifteen persons shall be exempt from Clause "C" unless otherwise ordered by the Inspector.

2. If gas has been found during the preceding twelve months, the mine must be inspected by a certificated fire boss with a locked safety

lamp within four hours of the commencement of each shift, and the fire boss shall make a report in writing to the manager, of the condition of the ventilation. If gas is found within 3 months the mine must be examined within 3 hours of the commencement of each shift.

3. In every mine where gas has not been found during the preceding twelve months the mine and roadways thereof shall be inspected and reported on by a competent person, once in every 24 hours.

4. All entrances to places not working must be fenced off.

5. Firemen's or examiner's stations shall be appointed at the entrance to a mine or to the different parts of the same mine and a workman shall not pass beyond such station until his place is stated to be safe.

6. When any part of the mine is dangerous by reason of gas or any cause whatever, all workmen must be withdrawn from the mine, or from such part as is dangerous. The mine shall then be inspected by a competent man and a report made and recorded in a book kept for that purpose.

7. (a) Locked safety lamps must be used in all workings which are approaching any place where gas may be encountered. In any part of a mine where safety lamps are used no person must have in his possession lucifer matches, keys for opening lamps, tobacco, cigarettes, or any appliance for striking a light.

(b) When it is necessary to work with a safety lamp, no naked lamps shall be used in the same district situated between the safety lamp place and the return airway.

(c) When more than forty safety lamps are used at any one time in a mine, a competent person shall be appointed to clean and keep the same in order.

8. Provisions relating to explosives in mines:

(a) They shall not be stored in the mine.

(b) They shall not be taken into the mine except in secure canisters containing not more than five pounds.

(c) A workman shall not have more than one case or canister in any one place at any one time.

(d) In the process of charging or stemming for blasting, a person shall not use any iron or steel pricker, charger, tamping rod, or stemmer, and only clay or other non-inflammable substances shall be used for stemming, such clay to be provided by the owner of the mine.

(e) No explosive shall be forcibly pressed into a hole of insufficient size, and when a hole has been charged the explosive shall not be unrammed and no hole shall be bored at a distance of less than 6 inches from a missed hole.

(f) In any one shot, two grades or qualities of powder shall not be used.

(g) Where locked safety lamps are required no shot shall be fired except by a shotlighter, who shall examine such hole, see that the shot is

properly placed, regulate the quantity of powder used and shall not allow the shot to be fired unless it is safe to do so.

(h) No shot shall be fired in any mine where inflammable gas has been found at the inspection conducted under General Rule 2, recorded last,—

(1) Unless such place has been examined by a competent person and it is found that the gas has cleared away, or

(2) Unless the explosive employed in firing the shot is so used with water or other substance as to prevent it from igniting gas or is of such a nature that it cannot ignite gas.

(i) If the place is dry and dusty no shot shall be fired unless the following conditions are observed:

(1) Unless all the places within a radius of twenty yards are in a wet state.

(2) Where watering would injure roof or floor, unless the explosive used is of such a nature that it will not fire gas or dust.

(j) Districts which have a separate intake and return airway are considered in this connection as separate mines.

(k) Explosives shall not be thawed underground.

9. Where a place is liable to contain a dangerous accumulation of water, the working approach shall not exceed 8 feet by 8 feet and bore holes must be driven five yards in advance.

10. Planes or hoistways more than thirty yards in length where people travel shall have a signal system and shall have man-holes at intervals of twenty yards or less.

11. On travelling ways where the traffic drawn by horse exceeds ten tons in any one hour, there shall be provided, where there is not two feet of standing room places of refuge at least three feet in width and at intervals of not more than 25 yards.

(2) Where the load is drawn by machinery, if there is not standing room of at least 2 feet man-holes shall be provided at intervals of not more than 20 yards.

(3) The Inspector may require a separate travelling way for the men.

12. Man-holes shall be whitewashed and kept clean.

13. The top of the shaft when not in use shall be fenced.

14. The top and entrances between the top and bottom of all shafts shall be fenced, but the fences may be removed temporarily.

15. Where strata is unsafe all shafts shall be lined.

16. All travelling roads must be secure.

16(A) Sufficient supply of timber shall be kept near the working face.

17. Every working shaft exceeding 50 yards in depth shall be fitted with guides and a signal system.

18. Cages employed for hoisting or lowering persons must have a

cover or hood except where they are worked by a windless or where persons are employed at work in the shaft.

19. A single linked chain shall not be used as a hoisting rope to raise or lower persons.

20. Hoist drums shall have horns or flanges to prevent the rope from slipping.

21. Hoists etc., used for raising and lowering persons shall be equipped with adequate brakes, and indicators.

22. An engine driver hoisting or lowering persons must be at least 18 years old.

(2) In the case of a horse-whim the driver must be at least 14 years old.

23. Every flywheel and exposed part of machinery must be fenced.

24. Every steam boiler must have steam and water gauges; also a proper safety valve.

25. Ladders must not be vertical or overhanging; and they shall have platforms at intervals of not more than 20 yards.

26. If more than 20 persons are ordinarily employed underground, a dry house must be furnished so that the men can wash themselves and change and dry their clothes.

27. The ladderway must be securely lined and separated from the main hoistway.

30. Head gear, ropes, machinery etc., shall be examined by a competent person at least once in every 24 hours, and such report shall be recorded in a book.

31. The Inspector may require the propping of undercut coal.

32. The workmen may appoint two of their number to inspect the mine at least once a month.

33. The workmen may appoint a committee chosen from among themselves to examine the seat of any accident.

34. Ambulances or stretchers, splints and bandages shall be kept at the mine ready for use.

35. After dangerous gas has been found in any mine, a barometer and thermometer shall be placed near the entrance of the mine above ground.

35(A). The books mentioned in these rules shall be supplied by the owners, and copies of the same shall be kept in the mine office.

Special Rules

52. The manager may submit for approval special rules.

(2) If these are accepted by the Minister they become law for such mine.

53. The special rules are first sent to the Inspector in duplicate and are afterwards submitted to the Minister.

54. The Minister may object to the special rules if they do not provide for the proper safety of the mine and miners and may modify them to suit.

(2) If the owner makes no objection to the modifications made by the Minister within 20 days, such rules shall be put in force.

(3) If the owner sends in his objections to the Minister within 20 days, the matter will then be referred to the Lieutenant-Governor in Council.

55. The manager may propose amendments to the special rules by writing to the Inspector.

56. The Minister may propose amendments to the special rules.

Coal Mines Act, 1908

The following [a] is an Act to amend the Coal Mines Act for the purpose of limiting hours of work below ground:

1. Subject to the provisions of this Act no person shall be below ground for more than 8 hours in 24.

(5) A repairing shift of workmen may, for the purpose of avoiding work on Sunday, commence their period of work on Saturday before 24 hours have elapsed since their last period of work so long as 8 hours have elapsed since the termination thereof.

(6) For the purpose of this Act, the term "Workman" means any person employed below ground who is not an official of the company or a furnace man, fan man, cager or onsetter, horse keeper or pumpman.

3. In case of emergency this Act may be suspended by Order in Council.

4. This Act also applies to Mines not entered by a shaft.

6. (1) This Act applies to all mines to which the Coal Mines Act applies and may be cited as the Coal Mines Act, 1908.

BRITISH COLUMBIA

Part I

Coal Mines Regulation Act [b]

3. Employment of Women, Girls and Boys.—No boy under the age of fifteen years and no girl or woman of any age shall be employed in the mines. No boy under the age of fourteen and no girl or woman shall be employed about the surface workings of a mine. Every manager shall, on the request of the Inspector, produce a copy of the certificate of birth or an affidavit setting forth the age of every boy employed. Provided, however, that this prohibition shall

[a] R. S., 1908, Chap. 17.

[b] An Act to consolidate and amend the "Coal-Mines Regulation Act" and Amending Acts, March 1st, 1911.

not affect the employment of any person engaged in clerical or domestic work in connection with the colliery.

4. No person, unless a male and at least twenty-two years of age, shall have charge of or operate any machinery, ropes, chains or tackle connected therewith used for conveying persons in any mine: Provided, that when such machinery is used solely for moving material in any mine, the same may be operated by a person not under the age of sixteen years. All persons in charge of or operating machinery used for conveying persons in any mine shall obtain a certificate every six months from a medical practitioner to show that he is mentally and physically fit to perform his duties.

5. If any person fails to comply with any provision of this Act with respect to the employment of women, boys, or Chinamen, or to the employment of persons about any engine, he shall be guilty of an offence against this Act. In case of any such contravention the owner, agent and manager shall each be guilty of an offence against this Act, unless he proves that he had taken all reasonable means to prevent such contravention.

6. If a boy employed about an engine was employed on the representation of his parent or guardian that he was of such age as required by this Act, the owner, agent, or manager of the mine and employer shall be exempt from any penalty, and the parent or guardian shall for such representation be deemed guilty of an offence against this Act.

Wages

7. No wages shall be paid to any mine employee at any public house, beer-shop, or place where spiritous liquor is sold.

8. Every person who contravenes or fails to comply with section 7 shall be guilty of an offence against this Act. In the event of such contravention by any person whomsoever, the owner, agent, and manager shall each be guilty of an offence against this Act, unless he prove that he had taken all reasonable means to prevent such contravention.

9. Where the amount of wages paid to any miner depends on the quantity of coal gotten by him, such person shall, unless the mine is exempted by the Minister of Mines, be paid according to the weight of the coal gotten by him, and such mineral shall, before screening, be truly weighed accordingly. Provided that nothing herein contained shall preclude the mine operators from agreeing with any or all persons employed in the mine that deductions shall be made for stone sent out of the mine with the coal. The deductions shall be determined by the weigher and checkweigher.

10. The Minister of Mines may, where he considers it necessary, exempt any mine from the provisions of Section 9.

11. If any person fails to comply with Section 9, he shall be guilty of an offence against this Act; and in the event of any such contravention, the owner, agent, and manager shall each be guilty of an offence against this Act, unless he proves that he had taken all reasonable means to prevent such contravention.

12. The miners who are paid according to the weight of the mineral gotten by them may, at their own cost, appoint a checkweigher. The checkweigher shall have every facility afforded to him to take a correct account of the weighing for the persons by whom he is so stationed; and if in any mine proper facilities are not afforded to the checkweigher as required by this section, the owner, agent, and manager of such mine shall each be guilty of an offence against this Act.

13. The checkweigher shall be authorized only to take account of the weighing; but must not in any way impede or interrupt the working of the mine.

14. The owner or manager of a mine may, on the ground that the checkweigher has impeded the working of the mine, complain to any court of summary jurisdiction for the purpose of having the checkweigher removed.

15. Proceedings for the removal of a checkweigher shall be deemed to be a matter on which two Justices of the Peace have authority by law to make an order in a summary manner, and the Court may in every case make such order as to the costs of the proceedings as they think just.

16. If in pursuance of any order of exemption made by the Minister of Mines, the persons employed in the mine are paid by the measure or guage of the mineral gotten by them, the provisions of the four next preceding sections shall apply in like manner as if the term "weighing" included measuring and gauging.

17. If the majority of the coal-miners request the owner, agent, or manager that the wages of the checkweigher be paid direct from the office of the mine, the owner, agent, or manager shall withold from the wages due the coal-miners a *pro rata* amount sufficient to meet the wages due the checkweigher.

18. No person employed in a coal mine shall remain underground for a longer period than eight hours from bank to bank in any one calendar day of twenty-four hours: Provided, however, that where more than two shifts are worked the onsetter, bottomer or cager, pumpmen, stablemen, and engineers in charge of constantly running machinery other than motors and machinery directly used for mining, drilling, or getting of coal at the face, the fire boss or the shift boss in charge of the mine or shift, may be

relieved at the place of duty; but in no case shall such person or persons remain underground for a longer period than eight hours and thirty minutes from bank to bank in any one calendar day of twenty-four hours; and further provided that nothing in this section shall be construed to prohibit extra hours of employment underground for such person or persons when necessitated by a weekly change of shift where more than two shifts are worked as aforesaid:

Provided, always, that nothing in this section contained shall apply where any mine employee has been employed or detained underground for a longer period than eight hours from bank to bank in any twenty-four hours owing to the occurrence of an accident to the mine, or in endeavouring to save or protect life and property, nor prohibit the manager or overman from entering a mine at any time and remaining therein for the necessary discharge of his duties.

No contravention of the foregoing provisions shall be deemed to take place in the case of any pumpman or engineer in charge of constantly running machinery who is underground for the purpose of dealing with any emergency requiring immediate attention and which, if neglected, would necessitate the closing of the mine.

No person shall be paid for work (other than the hereinbefore excepted work) performed in excess of eight hours in twenty-four hours.

Every person who fails to comply with the provisions of this section shall be guilty of an offence against this Act.

Shafts or Outlets

19. No person shall be employed in a mine unless there are two shafts or outlets having connection with every working seam; the shafts shall be separated by natural strata of not less than twenty-five yards in breadth, or other outlets of not less than ten yards in breadth; such shafts or outlets must have distinct means of ingress and egress available to the persons employed. There must be a communication of not less than four feet wide and four feet high between such two shafts or outlets. Proper apparatus for raising and lowering persons from such shafts or outlets shall be kept on the works belonging to the mine; and such apparatus if not in actual use at the shafts or outlets, shall be kept constantly available for use.

20. Where two or more shafts are required in terms of Section 19 of this Act, no mine shall be ventilated by a separate intake and return airway within the area of any one shaft; but separate shafts separated by not less than seventy-five feet of natural strata shall be used for the intake and return airways respectively: Provided, that nothing in this section shall conflict with the exemptions set forth in Section 24: and further provided that the Minister of Mines may grant such exemptions as he may see fit to mines already opened and in operation.

21. Failure to comply with sections 19 and 20 shall be deemed to be guilty of an offence against this Act.

23. No person shall be precluded by any agreement from doing such acts as may be necessary for providing a second shaft or outlet to the mine where the same is required by this Act.

24. The provisions of this Act with respect to shafts or outlets shall not apply in the following cases:

1. In opening up a mine or of any working to make a communication between two or more shafts, so long as not more than 20 persons are employed underground at any one time in the whole of the different seams in connection with each shaft or outlet in such new mine or such working.

2. In the case of a proved mine, so long as it is exempted in writing by the Minister of Mines on the ground either—

(*a*) That the quantity of output is not sufficient to repay the outlay by making a second shaft or outlet; or

(*b*) If the mine is not a mine with inflammable gas, that sufficient provision has been made against danger from other causes than explosions of gas by using stone, brick, or iron in the place of wood for the lining of the shaft and the construction of the midwall; or

(*c*) That the workings in any seam of a mine have reached the boundary of the property, and that it is expedient to work away the pillars, notwithstanding that one shaft or outlet may be cut off by so doing:

and so long as there are not employed underground at any one time in the whole of the seams in connection with the shafts or outlet in any such mine more than twenty persons, or (if the mine is not a mine of inflammable gas) than such larger number of persons as may for the time be allowed by the Minister.

3. In the case of any mine one of the shafts of which has become, by reason of some accident, unavailable, so long as such mine is exempted in writing by the Minister of Mines and the conditions on which such exemption is granted are observed.

Mining Submarine Areas

25. (1) No submarine seam of coal or stratified deposit shall be wrought under a less cover than 180 feet of solid measures. Provided that passage-ways may be driven to win the mineral under an area under a less cover, but such cover shall not be less than 100 feet of solid measures unless the condition of strata overlying such passage-way warrants the Minister of Mines, on the written report of the Chief Inspector, permitting a lesser cover; and further provided that nothing herein contained shall prevent any owner or lessee from

winning water-covered coal-areas (when other means of access thereto are not available) by caisson, shaft, or concrete revetment, or any other safe method of shaft sinking; but any coal or stratified deposit so won shall be mined and operated subject to the provisions of this section; and further provided that the Minister of Mines may grant such exemption from the provisions of this section to mines already opened, under such conditions as he may deem safe.

(2) Before opening up a coal or stratified deposit in submarine coal-areas, the owner or lessee shall submit to the Chief Inspector a plan of the system whereby such submarine coal-area is proposed to be worked, and such system must receive the written approval of the Chief Inspector before mining operations shall be commenced.

(3) The mine-plan of all submarine coal-areas shall show the depth of solid cover at specified distances along the lines of all main roads and working faces, and soundings shall also be taken at reasonable distances and recorded on such plans. When required so to do, the owner or lessee shall furnish to the Inspector of Mines a record of the depth of any marine sand, mud, silt, etc., which may overlay any submarine coal-area in which mining operations may be carried on.

Division of Mine into Parts

26. Where two or more parts of a mine are worked separately, the owner or agent of such mine may give notice in writing to that effect to the Inspector of the district, and thereupon each such part, shall for all purposes of this Act, be deemed to be a separate mine.

Certificated Managers and other Officials

28. (1) Every mine shall be under the control and daily supervision of a manager. The name and address of such manager shall be sent to the District Inspector.

(2) The underground workings shall be under the daily charge of an overman or overmen, shift-boss or shift-bosses, fire-boss or fire-bosses, and shotlighter or shotlighters, holding certificates under this Act, except as provided in section 30 of this Act.

(3) For the purposes of this section the manager and overman shall be separate persons. Provided, however, that in mines where the number of persons employed underground at any one time does not exceed fifty, the manager may also act as overman, unless the Inspector, by notice in writing, to the owner or agent, requires such mine to be under the control and daily supervision of both a manager and an overman.

29. A person shall not be qualified to be a manager, overman, shift-boss, fireman, or shotlighter of a mine unless he is for the time being registered as the holder of a certificate under this Act.

30. If any mine is worked for more than 14 days without such a manager, the owner and agent of the mine shall each be liable to a penalty not exceeding $250 and to a further penalty not exceeding $50 for every day during which such mine is so worked.

Provided that—

(*a*) The owner of such mine shall not be liable to any such penalty if he prove that he had taken all reasonable means to comply with this section and to prevent the mine being worked in contravention thereof.

(*b*) If, for any reasonable cause, there is for the time being no manager of a mine qualified as required by this Act, the owner may appoint, with the consent of the Chief Inspector, any person not holding a certificate under this Act to be manager for a period not exceeding two months. The owner shall send to the Inspector of the district the name and address of such manager, and the reason of his appointment; and

(*c*) A mine in which less than thirty persons are ordinarily employed underground shall be exempt from requiring the mine to be under the control of a manager unless the Chief Inspector by notice in writing requires the same.

But the operations underground shall be under the charge of a person holding a certificate as overman or shift-boss under this Act; Provided, however, that this section shall not apply to prospecting or exploratory workings where less than ten men are employed underground at any one time, unless the Chief Inspector requires the same to be under the control of a certificated overman or shift-boss.

Board of Examiners

31. For the purpose of granting in any part of British Columbia certificates of competency to managers of mines, overmen, shift-bosses, fire-bosses, and shotlighters for the purpose of this Act, examiners shall be appointed by a Board constituted as hereinafter mentioned:

32. (1) The Minister of Mines may from time to time appoint, remove, and reappoint fit persons to form such Board as follows, namely:—Two persons being owners, agents, or managers of a mine, and two persons being practical coal-miners, and one Inspector under this Act.

33. In no case shall a certificate of competency be granted to any candidate until he shall satisfy the Board of Examiners.

(*a*) If a candidate for a manager, that he is a British subject and has had at least five years' experience in and about the practical working of a coal mine, and is at least twenty-five years of age; or

if he has taken a degree in scientific and mining training, including a course in coal mining at a university or mining school approved by the Minister of Mines, that he has had at least four years' experience in and about the practical working of a coal mine.

(*b*) If a candidate for overman, that he has had at least five years' experience in or about the practical working of a coal mine, and is at least twenty-three years of age.

(*c*) If a candidate for shift-boss, fire-boss, or shotlighter, that he has had at least three years' experience in and about the practical working of a coal-mine, is the holder of a certificate of competency as a coal-miner, and is at least twenty-three years of age.

(*d*) A candidate for a certificate of competency as manager, overman, shift-boss, fire-boss, or shotlighter shall produce a certificate from a duly qualified medical practitioner or St. John's or other recognized ambulance society, showing that he had taken a course in ambulance work fitting him to give first aid to men injured in coal-mining operations.

39. If at any time representation is made to the Minister of Mines by an Inspector, or otherwise, that any certificated manager, overman, shift-boss, fire-boss, shotlighter, or coal miner, is unfit to discharge his duties, the Minister of Mines may cause an enquiry to be made into the conduct of such persons. The court of inquiry shall have the power to cancel or suspend the certificate of the person into whose conduct the inquiry has been made if it is found that he is, by reason of incompetency, drunkenness, or gross negligence, unfit to discharge his duty, or has been convicted of an offence against this Act.

44. The Minister of Mines may at any time, if it is shown to him to be just so to do, renew or restore on such terms as he thinks fit, any certificate which has been cancelled or suspended in pursuance of this Act.

Certificated Coal-Miners

48. No person shall be employed as a coal-miner in any mine who is not in possession of a certificate of competency as such.

50. No certificate of competency shall be granted to any coal-miner who does not satisfy the majority of the Board of Examiners that he is sufficiently conversant with the English language, and with the provisions of the Acts relating to coal-mining and rules and regulations made thereunder, to render his employment as such safe, and also that he had been employed in a coal-mine for at least twelve months previous to the date of his application for such certificate, and has sufficient knowledge of methods of coal-mining to render him competent to perform the duties appertaining to his employment.

52. Coal-cutting machinery may be operated by any person if he is accompanied by and under the control of a coal-miner under this Act.

Returns, Notices, and Abandonments

55. Returns must be made to the Inspector before February 1, for the year ending December 31. Such returns shall specify the quantity of coal mined, the number of persons employed underground and above ground.

56. Returns shall be made on the forms supplied by the Minister.

57. The Minister may publish any such individual return or the returns of any Inspector.

58. Every owner or manager of a mine who fails to comply with the three next preceding sections or makes false returns shall be guilty of an offence against this Act.

59. In case of loss of life or injury to any person employed in or about the mine by reason of any accident, the owner, agent or manager of the mine shall forthwith communicate such information to the Chief or District Inspector of Mines by telephone, telegraph, or messenger, if such means of communication are available, and in addition shall, within twenty-four hours next after the accident, send notice in writing thereof, and of the loss of life or personal injury occasioned thereby, to the Inspector of the district, and shall specify in such notice the character of the accident and the number of persons killed and injured respectively.

(2) In cases where loss of life or serious personal injury has occurred in any mine, the place of such accident shall remain undisturbed for a period of three days or until the Inspector of Mines shall have inspected the same: Provided, however, that a compliance herewith shall not seriously interfere with the general operation of the mine, and such place of accident shall have been examined by an employee, being a coal-miner or a member of the miners' or gas committee (if any), on behalf of the miners.

60. Notice of the subsequent death, of any person injured in the mine, shall be sent to the Inspector within twenty-four hours after such death comes to the knowledge of the owner, agent, or manager.

61. Every owner, agent or manager who fails to act in compliance with Sections 59 and 60 shall be guilty of an offence against this Act.

62. The owner, agent, or manager of a mine shall notify the Chief Inspector of the commencement, abandonment, discontinuance, or recommencement of work in any shaft. The Chief Inspector shall also be notified of any change in the management of the mine or change in the officers of the company.

63. The top of the shaft and any side entrance of an abandoned mine shall be securely fenced.

(1) The owner of the mine shall be liable for the carrying out of this section, and shall pay all cost of such fencing if incurred by any other person.

(2) Nothing in this section shall exempt any person from any liability under any other Act, or otherwise.

64. Any shaft which is not fenced as required by section 63, and is within fifty yards of any highway, or is in open or enclosed land, shall be deemed to be a nuisance.

65. Plans of all abandoned mines shall be filed with the Minister of Mines.

Inspection

67. Mine Inspectors may, from time to time, be appointed by the Lieutenant Governor in Council.

68. The Minister of Mines may designate one of such Inspectors as Chief Inspector, and assign to him such duties and designate any such place as the office of such Chief Inspector as he may see fit.

69. The Minister may at any time appoint any mining engineer or other person of scientific attainments or practical experience to make a special investigation and report upon any mining operations so far as they relate to the safety of life and property in any mine.

72. An Inspector shall not do private engineering work.

73. An Inspector shall have the power,—

(1) To make such examination and inquiry as may be necessary to ascertain whether the provisions of this Act relating to matters above ground or underground are complied with.

(2) To enter and inspect any mine at all reasonable times.

(3) To examine into the state of a mine with respect to the ventilation and safety of the persons employed in or about the mine or any mine contiguous thereto.

(4) To exercise such other powers as may be necessary for carrying this Act into effect.

(5) The Inspector shall inspect every mine, road and air-course, within his jurisdiction, at least once a month.

(6) Immediately after each visit the Inspector shall cause to be posted in some conspicuous place, at or near the mine, a statement showing what portion of such mine has been inspected and the conditions found to prevail therein; and he shall furnish a copy of such statement to the manager of such mine.

75. (1) If an Inspector, upon careful investigation, is of the opinion that a mine or any part thereof is in any respect dangerous, such Inspector shall notify the owner, agent or manager of the mine, stating in such notice the grounds of his opinion, and shall by the said notice require the same to be remedied. If the Inspector is of the opinion that any delay in remedying such matters would be dangerous, he may order the closing of the mine until the matter complained of be remedied; and in every such case the Inspector shall forthwith transmit to the Minister a copy of the order and a full report of the reasons therefor.

(2) Where an Inspector has reason to believe that a dangerous condition exists in any mine by reason of the approach of workings to old or abandoned workings, he shall at once report to the Chief Inspector, who in turn shall report to the Minister.

(3) The Inspector may examine any employee of a mine to ascertain if he is a capable man or dangerous on account of mental or physical incapacity; and an Inspector may order the removal of any such person from the mine.

76. The Inspector shall give notice of such order to the owner, agent, or manager of the mine, and any owner, agent, or manager who continues to employ such person shall be guilty of an offence against this Act.

77. If the owner, agent, or manager objects to any order of an Inspector under either of the two next preceding sections, he may, within twenty-one days after receipt of the notice of such order, send his objection in writing, stating the ground thereof, to the Minister; and thereupon the matter shall be settled by arbitration.

Plans of Mines

80. The owner, agent, or manager of every mine shall keep in the office of the mine an accurate plan of the mine, showing the working up to a date not more than three months previous and the general direction and rate of dip of the strata, together with a section of the strata sunk through. The Inspector shall be entitled to examine the plan and section, and for official purposes only to make a copy of any part thereof.

82. The owner, agent, or manager of a mine shall cause to be posted in some conspicuous place at or near the main openings of the mine, used for ingress or egress, a fairly accurate plan of such portions of the mine as are in active operation, or may under any circumstances be used as a means of egress from any portion in active operation, and all roads used as a means of egress shall be conspicuously marked in the mine.

83. Each Inspector shall make an annual report to the Chief Inspector, who likewise shall make his annual report to the Minister of Mines, which report shall be laid before the Legislative Assembly.

84. The Minister may direct an Inspector to make a special report on any accident.

Inquests

86. With respect to Coroner's inquests on the bodies of persons whose death may have been caused by explosions or accidents in mines, the following provisions shall have effect:

(1) The Coroner on holding an inquest, of which notice is required to be given to the Inspector, shall adjourn such inquest unless the Inspector or some person on behalf of the Minister of Mines is present to watch the proceedings.

(2) The Coroner shall give the Inspector four days' notice before holding an adjourned inquest.

(3) The Coroner, before the adjournment, may take evidence to identify the body, and may order the interment thereof.

(4) If an explosion or accident has not caused the death of more than one person, and the Coroner has given the Inspector forty-eight hours notice, it is not imperative to adjourn the inquest.

(5) An Inspector or any other directly interested person may examine any witness.

(6) The Coroner may require a remedy for any neglect as having caused the accident and the Inspector, if absent, shall be notified to that effect.

(7) Any person having an interest in the mine where the accident occurred or any relative of the injured person shall not be qualified to serve on the jury of an inquest.

Part II

General Rules

87. The following general rules shall be observed, so far as is reasonably practicable, in every mine:

Rule 1.—Every mine while being worked shall be thoroughly ventilated and furnished with an adequate supply of pure air to dilute and render harmless, noxious gases to the intent that the working-places of the shafts, levels, stables, and workings of such mine, shall be in a fit state for working and passing therein. Where the ventilation is produced by a mechanical contrivance the apparatus shall be placed in such a position and under such conditions as will tend to insure its being uninjured by an explosion: Provided, that nothing in this rule contained shall prevent the installation of auxiliary apparatus underground.

Rule 2.—An adequate supply of pure air shall mean not less than 100 cubic feet per minute for each man or boy, and not less than 300 cubic feet per minute for each horse or mule employed in a mine, and as much more as the Inspector may direct, which shall sweep the face of each working place and a notice stating the quantity of air required shall be kept posted

at the mouth of the mine by the Inspector whenever he directs that more air shall be furnished in a mine. Every mine shall be divided into splits of not more than seventy men in each split or district, and each district shall be supplied by a separate current of fresh air.

All intake air shall travel free from all unsanitary places and, where practicable, also free from old workings, and every place shall be bratticed to within four yards of the face; where open lights or explosives are used all brattice cloth or curtains shall be made fire-proof. The Inspector may order two doors to be placed on all main roads where a door is required.

Rule 3.—Should the air be supplied with such a velocity as to raise or create dust, or that such dust be carried into the workings in such quantity as to be a source of danger, the Inspector may give notice in writing thereof to the owner, agent, or manager of the mine as provided for in section 75 of this Act; and unless the same be forthwith remedied, the Inspector shall report the same to the Chief Inspector who in turn shall report to the Minister of Mines.

Rule 4.—In every mine in which inflammable gas has been found within the preceding twelve months, then once in every twenty-four hours if one shift is employed, and once in every twelve hours if two shifts are employed, that part of the mine shall be inspected or examined by a competent fire-boss with locked safety-lamp within three hours or less before commencing work in any part of the mine. The roadways and condition of ventilation are to be reported on and a workman shall not go to work in such part of the mine until such part of the mine and the roadways thereto are reported safe. Every such report shall be recorded in the book kept at the mine for that purpose and a true copy thereof shall forthwith be posted on a blackboard at the fireman's station. And at least once in every week a competent person or persons shall, with a locked safety-lamp, examine all air courses, stoppings, sealings, overcasts, wastes, and abandoned workings where accessible, and shall in like manner make a true report and post a copy thereof as set forth in the preceding part of this rule. In making such inspection the fireman shall use only a safety-lamp of a pattern approved by the Minister of Mines. Owing to the quantity of inflammable gas given off, or of the quantity of dust created by working, or any other cause, the Inspector may require that there shall be such interval as he thinks necessary between the finishing of work by one shift and the beginning of work by the next.

Rule 5.—Where gas has not been found in the mine within the preceding year, a competent man shall inspect that part of the mine and roadways leading thereto once every twenty-four hours. Inspection shall be made immediately before the commencement of shift. No workman shall enter such roadway or place until it is reported safe. Such report shall be recorded in a book without delay, and shall be signed by the person making

the same; and a true copy thereof shall forthwith be posted on a blackboard at the fireman's station.

Rule 6.—All places not in actual course of working shall be properly fenced across the whole width of such entrance.

Rule 7.—Firemen's station shall be appointed at the entrance to the mine or to different parts of the mine, and a workman shall not pass beyond any station until the part of the mine beyond the same has been inspected and reported to be safe.

Rule 8.—When any part of the mine is dangerous all workmen shall be withdrawn from the mine. The mine shall then be inspected by a competent man and a report made and recorded in a book kept for that purpose.

Rule 9.—Locked safety-lamps only shall be used in every working approaching any place where gas may be encountered; every safety-lamp must be examined by a competent person before it is used underground. No person shall have in his possession in that part of the mine where safety-lamps are used, such articles as matches, tobacco, cigarettes, keys, or any contrivance for opening a safety-lamp. The owner, agent, or manager, shall appoint a competent person to search any employee in the mine for any articles prohibited by this rule. Nothing in this rule shall be so interpreted as to prevent the use of safety-lamps provided with a relighting apparatus within the tube of such lamp of a pattern approved of and permitted by the Minister of Mines, or to prevent the use of any shot-igniter, electric firer, or other appliance for such purpose if of a pattern approved of and permitted by the Minister of Mines. No naked lamps shall be used in the same ventilating district as the safety lamps.

Rule 10.—In addition to the requirements of Rule 9, every safety-lamp so in use shall be tested in an explosive mixture of gas and air at least once every week and should any of the essential parts of such lamp be renewed after a lamp has been so tested, then such lamp shall be again tested. No single gauze safety lamp shall be allowed in any mine and every lamp shall be submitted to a mechanical air test whenever assembled after being taken apart, and if shown by such test to be imperfect or ineffective, its use shall not be permitted; and every colliery so using safety-lamps shall be equipped with apparatus for making such tests in some such form as shall be approved of by the Minister of Mines. This rule shall not apply to a mine in which less than thirty persons are ordinarily employed underground.

Rule 11.—Gunpowder or other explosive or inflammable substance shall only be used in a mine underground as follows:

(*a*) It shall not be stored in the mine.

(*b*) It shall not be taken into the mine except in a case or canister containing not more than four pounds.

(*c*) A workman shall not at any time have more than one case in any working place, nor shall there be more than four pounds of powder in any such cans. Provided, however, the Inspector may grant permission in writing that sufficient powder in such cases or cannisters may be taken into the mine to serve one round of shots in rock work or rock tunnels.

(*d*) In charging holes for blasting, an iron or steel pricker shall not be used nor shall a workman have one in his possession; an iron or steel tamping rod shall not be used; fine coal or coal-dust shall not be used as tamping; and only clay or other non-inflammable substances shall be used for tamping or stemming, and such shall be provided by the owner, agent, or manager of the mine.

(*e*) No explosive shall be forcibly pressed into a hole of insufficient size and when a hole has been charged, the explosive shall not be unrammed and no hole shall be bored for a charge within two feet of the "missed hole."

(*f*) Where a mine is divided into panels having separate intakes and return air-ways from the main air course, the provisions of this rule with respect to gunpowder or other explosive inflammable substance shall apply to each such panel in like manner as if it were a separate mine.

(*g*) It shall be illegal to use in any one shot any two classes, grades, or qualities of explosives.

(*h*) Thawing of dynamite underground is prohibited except by special permit of the Minister.

(*i*) No explosive shall be taken into or used in any mine unless such explosive shall be specially permitted and allowed by the Minister of Mines to be used in such mines.

(*j*) The owner, agent, or manager of any mine shall, upon demand of the Inspector, deliver to him free of charge a sample of reasonable size of each or any class of explosive, fuse, or detonator used in such mine; or the Inspector shall have the power to take such sample himself, and forward the same to the Minister of Mines. And should the Minister of Mines find such explosive, fuse, or detonator to be from any cause dangerous for use in such mine, he may restrict the conditions under which such explosives may be used.

Rule 12.—No explosive shall be used in any mine except in accordance with the following regulations:

1. (*a*) A competent person who shall be appointed for the purpose shall, examine all holes before firing a shot and shall see that conditions are safe before charging; he shall examine the character of explosive and shall regulate the quantity of explosive used. He shall examine all places contiguous thereto within a radius of twenty-

five yards and shall not allow the shot to be fired unless he finds it safe to do so, and the shot shall not be fired except under the direction of such competent person appointed for the purpose. In places where safety lamps are required to be used no shot shall be fired except by means of some form of igniter approved by the Minister of Mines. After a shot has been fired, the shotlighter shall examine the place and the men shall not begin work until it has been so examined and pronounced safe. In case of a "miss fire" it shall be the duty of the shot lighter to fence off such place and all approaches thereto outside of the danger zone, marking on such fence or fences "Missed-fire shot, keep out," with the date and the hour that such shot missed fire; and such place shall not be entered by any person until it shall have been re-examined by a competent official after the lapse of time hereinafter specified, and by him pronounced safe and the danger signals removed. In the case of an electric igniter having been used, the time which must elapse shall be fifteen minutes. In the case of a shot missing fire when any other means than an electric igniter is used, the time that must elapse shall be four hours.

(*b*) Detonators shall be kept under the control of some person appointed in writing by the manager for the purpose and may be issued to shotlighters only; and no other person shall take any detonator into a mine.

(*c*) It shall be unlawful for any person to expose any open case or cannister containing explosives or detonators within fifty feet of a naked light on the intake side of the air current, or within four feet in any other direction, or to prepare any charge with a naked light on his head.

2. If the place where the shot is to be fired is dry or dusty, then the shot shall not be fired unless one of the following conditions is observed, that is to say:

(*a*) Unless the place of firing and all contiguous places within a radius of twenty yards are at the time of firing in a wet state from a thorough watering, or other treatment equivalent to watering in all parts where dust is lodged; or,

(*b*) In the case of places in which watering would injure the floor or roof, unless the explosive is used with water or other contrivance as to prevent it from inflaming gas or dust, or is of such a nature that it cannot inflame gas or dust.

(*c*) All haulage or other roads that are dry or dusty shall, for a distance of forty yards from the place of firing, be watered sufficiently to allay dust.

3. If inflammable gas issues so freely that it shows a blue cap on the flame of the safety lamp, explosives shall only be used,—

(*a*) In the case of rock work or shaft sinking in which the ventilation is so managed that the return air from the place where the explosive is used, passes into the main return air course without passing any place in actual course of working; or,

(*b*) When the persons employed in the mine are out of it, or out of the part of the mine where it is used.

Rule 13.—In any mine or part of a mine where an undue quantity of dust is produced either on the roadways or working places which may tend to cause danger of explosion, in all haulage ways leading thereto and all working places in such sections of mines shall be thoroughly and effectively watered by some recognized and approved system of watering or other treatment equivalent to watering. If, in the opinion of the Inspector, an undue quantity of dust is produced, and the method employed is not adequate or effective, he may notify the manager in writing and proceed as provided in Section 75 of this Act; Provided, however, that the provisions of this rule shall not apply to any mine or separate split or panel of such mine if no explosive is permitted and safety-lamps are used in such separate part of the mine.

Rule 14.—Where a place is likely to contain a dangerous accumulation of water, the working approach in such place shall not exceed eight feet in width and there shall be constantly kept at a sufficient distance, not being less than five yards in advance, at least one borehole near the centre of the working, and sufficient flank boreholes on each side.

Rule 15.—Every underground plane on which persons travel, other than a working-place, not exceeding three hundred feet in length, which is self-acting or worked by an engine, shall be provided, if exceeding thirty yards in length, with a proper signal system; and shall be provided at intervals of not more than twenty yards with sufficient man-holes, five feet high, where the height of the seam will permit, otherwise, four feet high by four feet wide and four feet deep, and properly whitewashed, as places of refuge. There shall be provided at every slope and incline, whether self-acting or otherwise, stop-blocks, derailing switches, drags, or other suitable apparatus to effectively prevent accidents.

Rule 16.—Every level in which persons travel underground where the load is drawn by mechanical means, or by a horse or other animal, shall be provided at intervals of not more than fifty yards with sufficient man-holes or with a space for a place of refuge, which space shall be of sufficient length and of at least three feet in width.

Rule 17.—Every man-hole and space for a place of refuge shall be constantly kept clear and no person shall place anything in a man-hole or such space so as to prevent access thereto.

Rule 18.—The top of every shaft which for the time being is out of use, or used only as an air-shaft, shall be securely fenced.

Rule 19.—The top and all entrances between the top and bottom of every working or pumping shaft shall be properly fenced.

Rule 20.—Where the natural strata are not safe, every working or pumping shaft shall be securely cased, lined, or otherwise made secure.

Rule 21.—Every travelling road must be well timbered and secure.

Rule 22.—A reasonable supply of timber shall be constantly kept in each working place or conveniently near such working place.

Rule 23.—In every mine the Inspector shall decide the maximum number of persons who may enter a cage for the purpose of being lowered or raised.

Rule 24.—In any mine which is usually entered by means of machinery, persons of such age and mental and physical condition, as prescribed by Section 4 of this Act, shall be appointed for the purpose of working the machinery and shall attend for the said purpose during the whole time that any person is in the mine.

Rule 25.—Every working shaft shall be provided with guides and some means of communicating distinct and definite signals to and from the bottom of the shaft and every working entrance connected therewith and with the surface: Provided, however, sinking shafts shall be exempted from the use of guides unless the Chief Inspector may deem the use of such guides necessary.

Rule 26.—Sufficient cover overhead shall be used when lowering or raising persons in every working shaft except where the persons are employed about the pump or some work of repair in the shaft.

Rule 27.—A single link chain shall not be used for lowering or raising persons in any working shaft or plane, except for the short coupling chain attached to the cage or load.

Rule 28.—There shall be on the drum of every machine used for hoisting or lowering persons such flanges or horns and also if the drum is conical such other appliances as may be sufficient to prevent the rope from slipping. If in any mine the winding apparatus is not provided with some automatic contrivance to prevent over-winding, then the cage, when men are being raised, shall not be wound up at a speed exceeding three miles an hour after the cage has reached a point in the shaft to be fixed by the special rules.

Rule 29.—Machines used for hoisting and lowering persons must have adequate brakes, also a proper indicator, in addition to any mark on the rope which shows to the person who works the machine the position of the cage or load.

Rule 30.—Cages used for hoisting and lowering persons in any shaft shall be provided with a proper and adequate automatic safety clutch which will effectually prevent the falling of any cage upon the breaking of the rope.

Rule 31.—Every fly wheel and all exposed dangerous parts of the machinery used, shall be kept securely fenced.

Rule 32.—Every steam boiler shall be provided with a steam gauge, water gauge, and safety valve.

Rule 33.—After dangerous gas has been found in any mine, a barometer and thermometer shall be placed above ground in a conspicuous position at the entrance to the mine, and a water-gauge to show the ventilating pressure shall be placed either in the fan-house or underground between the intake and return airways.

Rule 34.—No person shall wilfully damage or without proper authority, remove or render useless any fence, casing, lining, guide, signal, chain, flange, horn, brake, indicator, water-gauge, steam-gauge, safety-valve, or other appliance or thing provided in any mine in compliance with this Act.

Rule 35.—Every person shall observe such direction with respect to working as may be given to him with a view to comply with this Act or the special rules.

Rule 36.—There shall be a daily inspection of the external parts of machinery, the state of the headgear, working places, levels, planes, ropes, and other works of the mine which are in actual use, and once at least in every week such inspector shall examine the state of the shafts by which persons ascend or descend and the guides or conductors therein and shall make a true report of the result of such examination; and such report shall be recorded in a book to be kept at the mine for that purpose and shall be signed by the person making the same.

Rule 37.—The workmen may appoint two of their number to inspect the mine. The report of such inspection shall be recorded in a book kept at the mine for that purpose.

Rule 38.—The books mentioned in this section or a copy thereof shall be kept at the office of the mine, and any Inspector under this Act, and any person employed in the mine at all reasonable times may inspect and take copies of and extracts from any such books.

Rule 39.—Every cage used in any mine shall be stationary and shall rest upon chairs or catches before any person is allowed to enter upon or leave the same. No person shall enter or leave a cage without the consent of the banksman or onsetter.

Rule 40.—At every mine the owner shall provide a suitable "ambulance box" with an additional such box for each 100 men employed in one shift above and underground collectively.

Rule 41.—In every mine where by reason of its depth or extent of its workings, egress to the surface cannot be conveniently obtained, there shall be provided suitable places for sanitary uses which shall be deodorised and constantly maintained in a sanitary condition, and suitable outhouses for sanitary purposes shall be similarly maintained in convenient positions contiguous to the surface works thereof. It shall be encumbent on the owner, agent, or manager of such mine to maintain all bunk houses, cook

houses, and wash houses controlled by such owner, agent, or manager in such cleanly and sanitary condition as may be approved by the Inspector of Mines.

Rule 42.—No Chinaman or person unable to speak English shall be appointed to any position of trust.

Rule 43.—Every person who contravenes or does not comply with any of the general rules of this Section shall be guilty of an offence against this Act; in the event of any contravention or non-compliance with the said general rules by any person whomsoever, the owner, agent, or manager shall each be guilty of an offence against this Act unless he proves that he has taken all reasonable means by publishing and to the best of his power enforcing the said rules as regulations for the working of the mine to prevent such contravention or non-compliance.

Rescue Work

88. There shall be established by the owner, agent or manager of every colliery such number of oxygen helmets or some form of mine rescue apparatus as may be approved by the Minister of Mines. Such mine rescue apparatus shall be constantly maintained in an efficient and workable condition and shall in all cases be so stored or placed in or about the mine as to always be available for immediate use.

The Lieutenant-Governor in Council may from time to time establish mine rescue stations for the purpose of supplementing, in case of need, the colliery installations and also for the purpose of training the holders of certificates of competency under this Act. It shall be encumbent on the owner, agent, or manager of every operating mine to have all certified officials who are physically fit, and not less than three per cent. of such number as the Chief Inspector of Mines may deem sufficient, of the workmen trained in the use of such established mine rescue apparatus.

Special Rules

89. At every mine there shall be established special rules for the conduct and guidance of the persons acting in the management or employed in the mine, so as to prevent dangerous accidents and to provide for the safety and proper discipline of the mine employees. Special rules, when established, shall be signed by the Chief Inspector and shall be observed in every such mine in the same manner as if they were enacted in this Act.

90. If any person fails to comply with such special rules he shall be guilty of an offence against this Act.

91. The manager of every mine shall, within three months of opening up a new mine or re-working an old mine, frame the special rules for such mine and transmit the same to the Chief Inspector, for the approval of the Minister.

92. The proposed special rules shall be posted up at the mine for at least two weeks before a copy of the same is transmitted to the Chief Inspector. Any person employed in the mine objecting to such rules shall send his objection in writing to the Chief Inspector.

93. If the special rules are not objected to by the Minister of Mines, within forty days after their receipt by the Chief Inspector, they shall be established.

94. The Minister may object to the special rules and propose modifications to the same in order to provide for the prevention of dangerous accidents in the mine.

95. If the owner, agent, or manager does not within twenty days after the modifications proposed by the Minister of Mines are received by him, object in writing to them, the proposed special rules, with such modifications, shall be established.

96. If the owner, agent, or manager sends his objections in writing within the said twenty days to the Minister of Mines, the matter shall be referred to arbitration.

101. Every person who pulls down or defaces any proposed special rule or any notice when posted up in pursuance of the provisions of this Act, with respect to special rules, or any notice posted up in pursuance of the special rules, shall be guilty of an offence against this Act.

Part III

Penalties

103. Every person employed in or about a mine, other than an agent, owner, or manager who is guilty of any act or omission, which, in the case of an owner, agent, or manager would be an offence against this Act, shall be deemed to be guilty of an offence against this Act.

104. Every person who is guilty of an offence against this Act shall, if no other penalty be prescribed elsewhere in this Act, be liable to a penalty not exceeding, if he is an owner, agent, or manager, one hundred dollars, and if he is any other person, ten dollars for each offence; and if the Inspector has given written notice of any such offence, then in case of an owner, agent, or manager to a further penalty not exceeding one hundred dollars, and not less than ten dollars for every day after such notice that such offence continues to be committed, and in case of other persons, to a further penalty not exceeding five dollars for every day after such notice that such offence continues to be committed.

105. Where a person who is an owner, agent or manager of, or a person employed in or about a mine is guilty of any offence against this Act

which, in the opinion of the Court that tries the case is one which was reasonably calculated to endanger the safety of the persons employed in or about the mine, or to cause a dangerous accident, and was committed wilfully by the personal act or negligence of the person accused, such person shall be liable to imprisonment for a period not exceeding three months.

108. The following provisions shall have effect:—

(1) Any complaint made in pursuance of this Act shall be made within six months from the time when the matter of such complaint first arose.

(2) The description of any offence under this Act, in the words of this Act, shall be sufficient in law.

(4) The owner, agent or manager may, if he think fit, be sworn and examined as an ordinary witness in the case where he is charged in respect of any contravention or non-compliance by another person.

(5) The Court shall, if required by either party, cause minutes of the evidence to be taken and preserved.

112. Where a penalty is imposed under this Act for neglecting to send a notice of any explosion or accident, or for any offence against this Act which has occasioned loss of life or personal injury, the Minister of Mines may, if he think fit, direct such penalty to be distributed among the persons injured and the relative of any persons whose death may have been occasioned by such explosion, accident or offence. Provided that—

(1) Such persons did not occasion the explosion or accident and were not parties to committing the offence.

(2) Such payment shall not in any way affect or be receivable as evidence in any legal proceedings relating to or consequent on such explosion, accident or offence.

Save as aforesaid all penalties imposed in pursuance of this Act shall be paid into the Provincial Treasury.

113. The owner, agent or manager of every mine shall send to the Minister of Mines or the Chief Inspector of Mines a return of any special facts relating to the safety of the mine whenever required.

Part I

Mineral Act [a]

3. Free Miners and Their Privileges.—Every person over 18 years of age, and every joint stock company, on taking out a free miner's certificate shall be entitled to all the rights of a free miner.

[a] Statutes of B.C., Chap. 135, 1897. Revised up to 1911.

4. All miners' certificates shall run from date of issue to May 31st next following. Certificates are not transferable and may be issued by any gold commissioner or mining recorder.

5B. Upon payment of a fee of $15, certificates which have been allowed to expire may be renewed within 6 months.

8. The penalty for mining without a "free miner's certificate" is a fine not exceeding $25 and costs.

9. Only the holders of unexpired free miners' certificates are entitled to an interest in any mining property. Shareholders need not be free miners.

12. A free miner may enter, locate or prospect upon any waste land of the Crown, excepting land occupied by buildings, orchards, Indian reservations or naval reservations. Land laid bare by placer mining must not be staked by any other person for a period of 6 months. A prospector must give security for damage caused by entering upon private lands.

13. A free miner, while actually prospecting, may kill game for his own use in an unorganized district only.

14. A free miner shall have all the rights and privileges granted to free miners by the Placer Mining Act.

Part II

Mineral Claims and Mines

15. The size of a claim shall be 1,500 feet square. All angles shall be right angles, except when bounded by other claim lines.

(a) Fractional claims shall not be greater than 1,500 ft. in length by 1,500 ft. in breadth.

16. A mineral claim shall be marked by two legal posts placed as near as possible on the line of the ledge or vein. Such posts shall be numbered No. 1 and No. 2. Upon Nos. 1 and 2 shall be written the name given to the claim, the name of locator and the date of the location.

Upon No. 1 post there shall also be written the words "Initial post," the approximate direction of No. 2 post and a statement of the number of feet lying to right and left of the line from No. 1 to No. 2 post.

All the data written on the posts must be sent to the Mining Recorder and shall form part of the record of such claim. The line from No. 1 to No. 2 must be blazed or marked out, and is known as the location line. It shall not be lawful to move No. 1 post, but No. 2 post may be moved inwards by the Provincial Land Surveyor when the distance from No. 1 post along the location line is found to exceed 1,500 feet. All fractional claims must be marked "Fraction."

(a) The holder of a mineral claim shall be entitled to all minerals which may lie within his claim, but he shall not be entitled to mine outside the boundary lines of his claim continued vertically downward.

(c) No mineral claim or "fraction" shall be recorded unless the application for the same is accompanied by an affidavit in the Form S, (Form T for a "fraction") made by the applicant: Declaring that the legal notices and posts have been put up on the claim; that mineral has been found in place; that the ground applied for is unoccupied by any other person as a claim, and is not occupied by any building, or any orchard, or Indian Reservation. The declaration shall also set out the name of the applicant and number of his miner's certificate, the date and where issued; the date of location; and all the information written on the posts. No mineral claim less than a full sized mining claim shall be recorded without the word "fraction" being added to the name of the claim.

(d) The location line of Posts Nos. 1 and 2 in a fraction shall be placed as near as possible on the line of the previously located claims, and the distance between the posts shall not exceed 1,500 feet. Upon posts No. 1 and No. 2, shall be written the name of the claim, the name of the locator and the date of location. Post No. 1 shall also bear the approximate compass bearing to Post No. 2.

16A. The penalty for altering or moving any legal post is a fine not exceeding $250.

19. Mineral claims situated within a distance of ten miles from the Recorder's office shall be recorded within 15 days of the staking thereof; one additional day shall be allowed for every additional ten miles, or fraction thereof.

20. A free miner shall be entitled to a record after he has furnished the Recorder with all the necessary particulars concerning the claim, and paid the necessary fees.

24. Any free miner having recorded a mineral claim shall be entitled to hold the same for one year and thence from year to year, provided that the free miner causes $100 worth of work to be done each year; and shall have obtained a certificate of work from the Recorder for the same.

In the case where an excess of at least $100 worth of work has been performed on the claim in one year, the miner shall have the right of recording such amount to cover the next year's assessment.

25. The holder of a mineral claim may, in lieu of the work required, pay to the Recorder the sum of $100 to cover the assessment work.

25A. When $500 worth of work has been done and recorded and a certificate of improvement has been applied for, no more work need be

done until such certificate has been issued and while such certificate is in force.

26. The holder of a mineral claim may use the surface and timber rights for mining purposes, but all remaining rights are vested in the Crown.

28. No irregularity happening previous to the date of the record of the last certificate of work shall affect the title of a mineral claim, except upon suit by the Attorney General based upon fraud.

29. No free miner shall be entitled to hold in his own name, or in the name of another person except by purchase, more than one claim on the same vein, but he may hold by location a claim upon any separate vein or lode.

33. The owner of a development tunnel shall have the right to all veins discovered in such tunnel: provided that he marks out such ground as a mining claim and records it within 15 days, and provided such veins are not included in any existing claim.

34. The interest of a free miner in his claim shall, save as to claims held as real estate, be deemed a chattel interest, equivalent to a lease, for one year, and thence from year to year, subject to the terms of this Act.

34A. A Crown grant of a mineral claim may be issued to the administrator of the estate of the deceased owner of such claim.

35. A Crown grant may be obtained for a mining claim on the payment of $500 to the Government of British Columbia; or, upon performing the assessment work in accordance with section 24 of this Act, and paying the balance of the sum of five hundred dollars, and having a proper survey made. (See also sec. 127.)

36. A certificate of improvement will be given when the applicant has complied with the following:

(a) Caused $500 worth of work to be done on the claim.

(b) Found a vein within the limits of the claim.

(c) Caused a proper survey to be made and the records thereof to be sent to the Lands Department.

(d) Caused the plats of the survey and notice of application to be posted on the claim and in the Recorder's office. Such notice shall contain:

(1) The name of the claim.

(2) The name of the lawful holder.

(3) The number of the holder's certificate.

(4) Notice of his intention to apply for a certificate of improvements at the end of 60 days for the purpose of obtaining a Crown grant.

(5) The date of the notice.

(e) Inserted a copy of such notice in the British Columbia Gazette and in a newspaper published and circulating in the mining division, for at least 60 days prior to such application.

(f) Filed a copy of the survey notes.

(g) Filed with the Recorder an affidavit of the holder of the claim made out in Form "G" and produced copies of the publications containing notices of the application for a certificate of improvements.

(h) Twenty days after the expiration of the term of the publication, unless a notice that an action has been filed in the office of the Mining Recorder, the Recorder shall forward Form "I" to the owner.

(i) Applied for a certificate of improvements within 3 months from the date of issue of Form "I".

37. A certificate of improvements can only be impeached on the ground of fraud.

38. After the issuing of a certificate of improvements it shall not be necessary to do any work on such claim.

39. A record of certificate of improvements entitles the owner to a Crown grant. If the claim is in the Railway Belt, a Crown grant will be given the applicant on payment of $5 per acre and recording the certificate of improvements. If applicant can make declaration that land is not fit for agriculture or of value for the timber growth on it—the price of the land is $1.00 an acre.

40. To obtain a Crown grant the holder of a certificate of improvements must make application to the Gold Commissioner and enclose $25- together with the field notes (Form "I") the Mining Recorder's certificate, plats, etc., within 3 months from the date of such certificate of improve, ments, and in default of such application having been made within such time, such certificate of improvements shall lapse and become void.

41. Claims may be transferred before a Certificate of Improvement has been given, but not between the time of such issue and the granting of a Crown grant.

44 and 45. A Crown grant of a mineral claim located on any waste or occupied lands of the Crown, shall transfer all rights to the minerals (other than coal) found in veins, lodes, etc., but shall reserve the rights of such prior occupants.

In case of land under timber lease, the timber shall belong to the lessee.

48. All judgments affecting mineral claims must be entered in the "Record Book."

49. Every conveyance, bill of sale, mortgage or other document of title relating to any mineral claim, not held as real estate, or mining interest, shall be recorded within the time prescribed for recording the mineral claims; provided, always, that failure to do so does not invalidate claim. After the issuance of a Crown grant, it shall not be necessary to register any subsequent documents with the Recorder, but such documents may be registered in the same manner as are other documents of title relating to the transfer of real estate.

50. No transfer of any mineral claim, or any interest therein, shall be enforceable unless the same shall be in writing and recorded by the Mining Recorder.

Mill Sites 54. A free miner may locate a mill-site upon any occupied and unreserved Crown land not known to contain mineral, and such mill-site shall not exceed 5 acres. The mill site shall be as nearly as possible in the form of a square.

Tunnels and Drains 58. Upon depositing with the Commissioner security for any damage that may be done thereby, the holder of a mineral claim may obtain the right to run a tunnel or drain through any land for the purpose of developing his claim.

Part III

Mining Partnerships 59. All mining partnerships shall be governed by the provisions hereof, unless other and written articles of partnership exist.

60. Partnerships shall be deemed to be for a year and are renewable by tacit consent.

61. The business of a mining partnership shall be mining and such other matters as pertain solely thereto.

62. A mining partnership can locate and record a mineral claim for each member, but the name of every partner and the number of every partner's free miner's certificate shall be on the record of every such claim. The partnership's name shall appear on every such record, and all such claims shall belong to the partnership; provided, always, that no member who holds a mineral claim by right of location shall be entitled in the name of a partnership or otherwise to hold an interest in any mining claim, situated on the same vein.

63. Should any partner allow his miner's certificate to lapse his share shall become vested in the continuing partners, pro rata, according to former interests.

64. The number of votes a member shall have depends on his interest.

65. A majority of such votes shall determine in what manner the claim will be worked and the extent and manner of levying the assessments to defray the expenses incurred by the partnership.

66. All assessments shall be payable within 30 days after being made.

Part V

Gold Commissioner

106. The Gold Commissioner shall be appointed by the Lieutenant-Governor in Council.

107. The Commissioner may grant licenses and fix the amount of security for damage caused by driving tunnels and constructing drains.

108. He may permit the re-location of an abandoned or forfeited claim, provided that such re-locations shall not interfere with the rights or interests of others.

109. He may mark out a space of ground for deposits of leavings and deads from any tunnel, claims, etc., upon such terms as he may think just.

110. The Gold Commissioner shall have the power to order any mining work to be carried on so as not to interfere with or endanger the safety of the public, any public works, or mining property; and any abandoned works may by his order, be filled in or guarded.

112. He shall issue mill-leases.

113. Upon being satisfied that the lessee of a mill-site has constructed works thereon for milling purposes to an amount of not less than $500, the Gold Commissioner shall issue his certificate to that effect.

Part VII

Penal and Miscellaneous

127. The owner of a mining claim who has had the claim surveyed as required by sub-section (c) of Section 36, and has filed the plats and survey notes of same with the Recorder, shall be entitled to have the cost of the survey counted as $100 work done on the claim. (Refers to assessment work. See sec. 24.)

128. The owner of a mineral claim located on waste lands of the Crown, or on lands not already lawfully occupied, shall be entitled to

receive a Crown grant of such surface rights on payment of the sum of $5 per acre and a fee of $10 for the Crown grant.

136. Any person wilfully acting in contravention of this Act, or refusing to obey any lawful order of the Gold Commissioner, shall be liable to a fine not exceeding $250 or to imprisonment for any term not exceeding three months.

Fees to be Charged

For every free Miner's certificate issued to an individual	$ 5.00
For every free miner's certificate for a period for less than a year a proportionate part of the fee charged for a certificate for a year.	
For every free miner's certificate issued to a joint stock company:	
(a) Having a nominal capital of $100,000 or less	50.00
(b) Having a nominal capital exceeding $100,000	100.00
Every substituted certificate	1.00
Recording any claim	2.50
Recording every certificate of work and filing affidavit	2.50
Recording any "lay over," or every other record required to be made in the "Record Book"	2.50
Recording every abandonment, including the memorandum to be written on the record	10.00
For any other record made in the "Record of Abandonments"	2.50
For recording every affidavit, where the same does not exceed three folios of 100 words	2.50
For every folio over three, 30 cents per folio.	
The above rate shall be charged for all records made in the "Record of Affidavits."	
For all records made in the "Record of Conveyances," where the same do not exceed three folios	2.50
For every folio over three, a further charge of 30 cents per folio.	
For abstracts and other certificates, such fees as the Mining Recorder may consider fair, subject to appeal to the Minister of Mines.	
For filing any document	.25
For a Crown grant of the mineral rights	25.00
For a Crown grant of the surface rights	10.00

Part I

Placer Mining Act [a]

Free Miners and Their Privileges.—Every person at least 18 years of age, and every joint stock company, upon taking out a free miner's certificate, shall be entitled

[a] Revised Statutes of British Columbia, Chap. 136, 1897, with amendments to 1911.

to all the rights and privileges of a free miner. A free miner's certificate issued to a company shall be issued in its corporate name. A free miner's certificate shall not be transferable.

4. A free miner's certificate shall run from the date thereof and expire at midnight on May 31st next after its date, or some subsequent thirty-first day of May. Only one person or joint stock company shall be named in each certificate. Free miners' certificates may be issued by any gold commissioner or mining recorder. The fee payable therefor shall be as provided in the schedule of fees to this Act.

5(b). Expired certificates may be renewed by Special Form, within six months, upon payment of a fee of $15. In the case of a joint stock company, the fee for such special certificate shall be $300.

6. If any person or joint stock company shall apply for a free miner's certificate at the Mining Recorder's office during his absence and leave the required fee, he shall be entitled to have such certificate from the date of such application.

7. "Substituted certificate" may be issued for any free miner's certificate that has been lost or destroyed.

9. No person or joint stock company shall be recognized as holding mining property unless he or it shall have an unexpired miner's certificate; provided, nevertheless, that should any co-owner fail to keep up his certificate, such failure shall not cause a forfeiture of the claim, but his interests shall become vested in his co-owners. The filing in the office of the Mining Recorder of a certificate from the Department of Mines that the free miner's certificate of such co-owner has lapsed shall be sufficient evidence of such lapse to vest the title in the continuing co-owners on the record in the office of such Mining Recorder; provided, that a shareholder in a joint stock company need not be a free miner; and provided, also, that this section shall not apply to placer mines for which a Crown grant has been issued.

9(a). Every person who mines for any mineral for his own use on Crown lands without a miner's license is liable to a penalty of $25 and costs.

11. Every free miner shall, during the continuance of his license, have the right to enter, locate and mine gold and other precious metals upon any land other than town sites, lands occupied by buildings and Government reservations. An agent cannot locate a placer claim without having first recorded the necessary power of attorney.

An agent cannot locate and record more than one claim each for two principals on each separate creek, ravine or hill.

12. A free miner must give security for damage caused by entry on private land.

13. A free miner while actually engaged in prospecting may kill game for his own use.

14. A free miner has all the rights granted to a free miner under "The Mineral Act," 1896.

15. Every free miner has a right to locate only one claim on each separate creek, ravine, hill or bar diggings. He can hold any number by purchase. On giving notice that he has abandoned a claim on a creek, he may re-stake another on such creek.

Part II

Size and Nature of Placer Claims

16. The size of placer claims shall be as follows:

In creek diggings a claim shall be 250 feet long measured in the direction of the stream, and shall extend in width 1,000 feet, measured from the general course of the stream 500 feet on either side of the centre thereof.

In bar diggings a claim shall be:

(a) A piece of land not exceeding 250 feet square on any bar which is covered at high water; or

(b) A strip of land 250 feet long at high-water mark, and in width extending from high-water mark to extreme low-water mark.

In dry diggings a claim shall be 250 feet square.

17. Placer claims of the following dimensions, measured along the water courses, are allowed to any free miner who discovers new placer localities at least 5 miles away from any previous claim:

To one discoverer, 1 claim.....600 feet in length.

To a party of 2 discoverers, 2 claims amounting together to 1,000 feet in length. To each member of a party beyond two in number, a claim of the ordinary size only.

18. A new stratum of auriferous gravel, situated in a locality where all placer claims are abandoned, shall be deemed a new mine; and dry diggings discovered in the vicinity of bar diggings shall be deemed a new mine and vice versa. A discoverer's claim shall be considered as one ordinary claim, in respect to recording, working, etc.

Locating Re-recording, Working and Lay-overs

20. Every placer claim shall be as nearly as possible rectangular in form and marked by four legal posts at the corners thereof, and the side lines shall be blazed or marked. The posts must bear the locator's name, number and date of issue of certificate, date of location and name of claim. Monuments

may be used to mark the boundary lines in untimbered localities; but such monuments shall not be used as corner posts.

22. The title to a claim shall be recognized according to priority of location, subject to validity of record.

23. A claim within 10 miles of the Recorder's office must be recorded within 15 days of staking. An allowance of one day is made for every additional 10 miles or fraction thereof.

27. A claim may be recorded for one or more years upon payment of the fees set out in the schedule of this Act. The last date on which a re-record can be made shall be the anniversary of the original record of the claim.

28. A free miner shall at any time during the existence of his record or re-record, be entitled to extend the term of his interest in his placer claim for one or more years by re-recording such claim and paying the proper fees set out in the schedule. Such re-record shall be made in the Record Book.

31. A free miner, having duly located and recorded a placer claim shall be entitled to hold the same during the existence of his record, upon complying with all the terms and conditions of this Act.

32. Any free miner shall have the exclusive right of entry upon his placer claim for the purpose of working it and living thereon. Upon application, the Gold Commissioner may allow other free miners such rights of entry as may be necessary for the working of their claims.

33. No irregularity made prior to the current record shall affect the title of a claim; provided that the claim has been properly staked, or that the stakes have not been illegally moved.

34. Tunnels, shafts and ditches shall be considered as belonging to the placer claim for the use of which they are constructed.

35. In tunnelling under hills, on the frontage of which angles occur, or which may be an oblong, no party shall be allowed to tunnel from any of the said angles, nor from either end so as to interfere with parties tunnelling from the main frontage.

36. The interest of a free miner in his placer claim shall be deemed a chattel interest equivalent to a lease.

37. The holder of a placer claim shall have no right to any vein within its limits unless the same is recorded as a mineral claim.

38. Every claim shall be worked continuously during working hours. It shall be deemed to be abandoned when the same shall have remained

unworked on working days for the period of 72 hours, except during the close season, or on account of some lay-over, or during sickness, or for some reasonable cause.

39. Every free miner, or company of free miners, shall be entitled to a leave of absence for one year from his or their placer claim or set of claims,—

(*a*) Upon proving to the Gold Commissioner that he or they has or have expended on such claim, or on any portion of the set of claims, in cash, labour, or machinery, an amount equal to one thousand dollars on each full interest, without any return of gold or other minerals in reasonable quantities from such expenditure; and

(*b*) Upon the application for such leave being signed by all the holders of the claim or set of claims.

Such leave of absence shall not be deemed to relieve the holder of such claim or set of claims from carrying out the provisions of this Act respecting free miners' certificates, records and re-records of such claims; nor shall this section affect the discretionary power of the Gold Commissioner with respect to granting a leave of absence under other conditions.

(2) The provisions of this section shall not apply to land or mining property held under mining leases, pursuant to Part VII. of this Act, but such leases shall in all matters be governed by the terms thereof.

40. Every forfeiture of a placer claim shall be absolute.

41. No placer claim located and recorded in any district within 14 days before or during the close season, shall be entitled to a lay-over unless so much work shall have been done as in the opinion of the Gold Commissioner entitles the holder to such lay-over.

42. In the case where there is in sufficient water to carry on the work, a lay-over may be granted by the Commissioner.

(2) The provisions of this section shall not apply to mining leases, pursuant to Part VII. of this Act.

(3) No free miner shall divert any creek or stream unless notice of his intention has been given to the adjoining claim holders, such notice to be posted in a conspicuous place on his claim for a least ten days before diverting such stream.

43. Every bill of sale, transfer, etc., shall be recorded within the time prescribed for recording placer claims.

43A. All judgments affecting placer claims shall be recorded.

44. No transfer of any placer claim shall be enforceable unless the same shall be in writing, signed by the transferrer or his agent and recorded in the Record of Conveyances.

PART III

Tunnels and Drains

48. Any free miner requiring to construct a tunnel or drain, in connection with his claim, through any occupied or unoccupied lands, must obtain a license from the Gold Commissioner for that purpose, and record the same, and give security for any damage that may be caused.

49. Such tunnel or drain shall be considered as part of the claim for which the same was constructed.

50. Any free miner may apply to the Gold Commissioner for a grant of the right of way and entry through any mining ground in his district, for the purpose of constructing a drain for the public drainage of mines.

51. The application for every such grant shall be in writing and addressed to the Gold Commissioner, and shall set out the name of applicant the nature and extent of the proposed drain, the amount of toll to be charged and the term of years for which such grant is to be made. A notice of such application shall be posted on the Recorder's office and on the ground for 15 days before such grant shall be made.

52. The sum of $25 shall also be deposited with the application, such sum to be returned if application is not granted.

53. Such grants shall be in writing and signed by the Gold Commissioner and shall grant, for not more than twenty years, the right of way and entry and such powers to assess, collect toll from all persons using such drain, or benefited thereby as the Gold Commissioner shall think fit.

54. The grantee shall construct a drain of sufficient size; shall keep such drain or drains free from all obstructions; shall construct proper tap-drains from adjacent claims; and in the construction and maintenance of such drains he shall not damage the property of others and if any such damage is done he shall make compensation therefor.

55. The grantee shall pay an annual rental to the Mining Recorder of $25 for each quarter of a mile.

55A. No placer claim shall be open to location, for twelve months after the death of the lawful holder, unless with the written permission of the Gold Commissioner.

PART IV

(For Water Rights)

See Water Act, Statutes of British Columbia, Chap. 48, 1909.

Part V

Mining Partnerships

57. All mining partnerships shall be governed by the provisions hereof, unless other and written articles of partnership have been agreed upon.

58. A mining partnership shall, unless otherwise agreed upon, be deemed to be a yearly partnership and renewable from year to year by tacit consent.

59. The business of each partnership shall be only mining and matters pertaining to mining.

60. Mining partnerships can locate, record and re-record a placer claim for each partner, but the name of the foreman and every partner and the number of his free miner's certificate shall be on all records. The claims so acquired shall be the property of the partnership. A free miner holding interest in partnership claims shall not be entitled to locate a claim on the same creek, ravine, bar or hill.

61. Not more than ten adjoining claims may be consolidated to form a mining partnership. Upon the consent of the Gold Commissioner for such consolidation all the work necessary to be done to hold all the claims may be performed on one or more of the claims.

Limited Liability

69. Any mining partnership, free from debt, may limit the liability of its members upon filing with the Recorder a statement containing the name of the partnership, the location and size of every claim, and the particular interest of each partner; and also placing upon the claim in large letters, the name of the partnership, followed by the words "Limited Liability."

75. No partnership shall declare any dividend until all its liabilities have been paid.

Part VI

Bed-rock Flumes

78. One or more free miners may apply to the Gold Commissioner for a grant of exclusive rights of way through any mining ground in his district for the purpose of laying and maintaining a bed-rock flume.

80. Such grant shall be for a term not exceeding 5 years.

81. The grantee shall be entitled to the following rights and privileges:

(a) The right of way through any unworked creek or ravine, and the exclusive right to locate a strip of ground 100 feet wide and 200 feet long in the bed thereof to each grantee named in such grant.

(b) The right of way and entry upon any creek, gulch or ravine worked by miners for any period longer than two years prior to such entry, and already abandoned, and the exclusive right to stake out and work both the unworked and abandoned portions thereof, one hundred feet in width and one-quarter mile in length, for each grantee named in the grant.

(c) Such right of way and entry upon any river, creek or ravine discovered within two years next preceding the date of application, and upon any portions of which any free miner is legally holding and working as may seem advisable to the Gold Commissioner.

(d) The right of way and entry upon all placer claims which are being worked, for the purpose of constructing and maintaining the flume; provided, that the owner of the claim shall be entitled to take the gold and other minerals found in the cut so made.

(e) The right to all gold or other minerals in his flumes.

(f) No person, locating new or abandoned ground within the limits of such grant, after the notice of application has been given, shall have any right or title as against such grantee to the ground so located.

82. Any claim holder may connect with such bed-rock flume.

84. The grantee shall lay 100 feet of flume the first year and 300 feet annually thereafter until completed. The amount of flume to be laid may be reduced at the discretion of the Gold Commissioner.

85. Any free miner working a claim where a bed-rock flume exists shall be entitled to tail his sluices, hydraulics, and ground sluices into such flume, but so as not to obstruct the free working of such flume by rocks, stones or debris.

86. The grantee shall record his grant with the Mining Recorder within three days of the receipt of the same, and shall pay an annual rental of $12.50 for each quarter of a mile of right of way held under such grant.

PART VII

Leases

90. The Gold Commissioner, with the sanction of the Lieutenant-Governor in Council, may grant a placer mining lease or a lease for precious stone diggings for a period of 20 years, and any free miner desiring to obtain a lease shall first stake out the ground by placing a legal post at each corner, and shall post a notice near the claim and in the Recorder's office setting out his name, the locality and quality of the ground to be acquired and the terms of the lease to be applied for.

91. Within 30 days after staking the ground and posting the notices, application must be made setting out the name of each applicant, the num-

ber of each applicant's free miner's certificate, the locality of the ground, the terms of the lease applied for and the rent proposed to be paid.

92. A person making application for such lease must file a plan of the ground in triplicate with the Gold Commissioner. A fee of $20 deposit must also accompany the application.

93. Application shall not be for areas and distances greater than the following:

In creek diggings on abandoned or unworked creeks, half a mile in length.

Any other placer ground, 80 acres; but in no case shall any lease extend along any creek or river more than 500 yards, creek diggings excepted.

Precious stone diggings, 10 acres.

94. No lease shall be granted for occupied ground or land available for agricultural purposes.

98. Every lease shall provide for securing to the public reasonable rights of way and water, and for the miner-like manner of working the ground continuously, and shall reserve the right for any free miner to ent ersuch ground and mine for minerals in veins or lodes.

99. A lease may be forfeited for the non-observance of any condition in the lease.

100. Leases shall be granted for placer mining only, and shall not be sub-let without the written assent of the Gold Commissioner.

101. A lease may be extended in order to permit the working of any remaining mining ground.

102 and 102A. Not more than ten adjoining leases may be consolidated, and such holdings shall not exceed 640 acres.

103. It shall be lawful for the Gold Commissioner, with the consent of the Lieutenant-Governor in Council, to grant a lease of the bed of any river below low-water mark for dredging purposes, for a distance not exceeding five miles and for a term not exceeding 20 years; provided always that every such lease shall reserve the right to every free miner or mining company to run tailings into such river at any point thereon, and to mine two feet below the surface of the water at low-water mark, by putting in wing dams, whether such free miner shall locate before or after the date of such lease.

104. It shall not be lawful for any free miner to contruct wing dams within 1,000 feet of a dredger while working, nor to obstruct a dredger in any manner.

Part IX

Gold Commissioner's Powers

128. It shall be lawful for the Gold Commissioner to perform the following acts in accordance with the provisions of this Act:

(a) He may lay over any claim and grant leave of absence for such period as he may think proper.

(b) He may prescribe the number of miners who shall be required to prospect a set of claims until gold in paying quantities is found.

(c) He may permit the driving of tunnels.

(d) He may mark out a space for the leavings of tailings.

(e) He may extend the limit of a claim in bench diggings beyond the limits of the bench, but not to exceed 250 feet square.

(f) He may employ a surveyor to mark out any boundary.

(g) He may permit mining posts to be moved.

(h) He may order any mining work to be carried on so as not to endanger life or property.

(i) He may, upon application made to him, allow a free miner such right of entry upon any adjacent claim as may be necessary for the working of his claim, and upon such terms as may to him seem reasonable.

(j and k) He may grant licenses and right of way for flumes.

(l) He may grant and renew placer mining leases.

Part XI

Penal and Miscellaneous

144. Any person acting in contravention of this Act or refusing to obey any lawful order of the Gold Commissioner shall be liable to a fine not exceeding $250, or to imprisonment for three months.

152. An annual tax of 25 cents per acre shall be levied on every claim held under Crown grant.

Schedule G.—Scale of Fees Charged

Free Miner's certificate	$ 5.00
Free Miner's certificate for less than a year, a proper proportion of the fees for a year.	
Free Miner's certificate to a joint stock Company:	
(a) Capitalization of $100,000 or less	50.00
(b) Capitalization exceeding $100,000	100.00
Every substituted certificate	1.00
Recording a claim for a year	2.50
Re-recording any claim (for each year)	2.50
Recording any "lay over," or every other record required to be made in the "Record Book"	2.50

Recording every abandonment, including the memorandum to be written on the record	2.50
For any other record made in the "Record of Abandonments".	2.50
For recording every affidavit, where the same does not exceed three folios of 100 words	2.50
For every folio over three, 30 cents per folio.	
The above rate shall be charged for all records made in the "Record of Affidavits."	
For all records made in the "Record of Conveyances," where the same do not exceed three folios	2.50
For every folio over three, a further charge of 30 cents per folio.	
For abstracts and other certificates, such fees as the Mining Recorder may consider fair, subject to appeal to the Minister of Mines.	
For filing any document	1.00
For every lease	5.00

The Coal Mines Act[a]

PROSPECTING LICENCES.—2. Any person desirous of acquiring a licence to prospect for coal or petroleum upon any unreserved lands held by the Crown or on which the coal and petroleum rights are reserved to the Crown shall, before entering into possession of such lands to work for coal or petroleum, place at one angle or corner of the land to be applied for a stake marked thus, A.B.'s N.E. Corner, and shall post a notice for thirty days on a conspicuous part of the land and in the Government office of the district, stating his intention to apply for a license. He shall also publish a like notice for thirty days in the British Columbia Gazette and in some newspaper circulating in the district.

3. After the expiration of the thirty days' notice, and within two months from the date of its first publication in the Gazette, he shall make application to the Deputy Minister of Lands for a prospecting licence over such lands for any period not exceeding one year. Such application shall be in duplicate and shall be accompanied by a fee of $100 for each licence and a plan and description of the plot of land over which the privilege is sought.

4. The plot of land sought to be acquired under a licence shall be rectangular in shape and shall not contain more than 640 acres. The boundaries shall measure eighty chains and shall run true north and south, and true east and west.

5. The Lieutenant-Governor in Council may grant a lease, for a term of five years at an annual rental of 15c per acre, to a licensee who

[a] R.S. of B.C., chap. 137, 1897, as amended by chap. 37, 1903-04 chap. 28, 1907. chap. 33, 1910 and chap. 34, 1911.

discovers coal or petroleum on the lands under licence; and if, during the term of such lease or within three months after the expiration thereof, the lessee can show conclusively that he has continuously prosecuted the work of coal or petroleum mining, and has fully carried out the provisions of his lease, he shall be entitled to purchase the said lands, including the coal and petroleum thereunder, at the rate of twenty dollars per acre, or in the event of the land being alienated, or held under lease, he shall be entitled to obtain a Crown grant of the coal and petroleum rights upon payment at the rate of fifteen dollars per acre. Such grants shall reserve to His Majesty the royalty mentioned in paragraph (6) sub-section (1) of this section.

(a) Provided that a lease shall not be issued until after the applicant has had the land surveyed in a legal manner and to the satisfaction of the Minister of Lands.

Provided, also, that in the case of lands held under licence adjoining Crown-granted lands owned by the licensee of such lands, the grant to which conveys the coal thereunder, such licensee shall have the option of grouping nine adjoining licences with such Crown-granted lands and of performing on the said Crown-granted lands the work required to be performed by this section upon lands held under licence, provided that he can prove to the satisfaction of the Minister of Lands that there are reasonable grounds for believing that coal exists under said lands held under licence; such work to be performed to the satisfaction of the Minister of Lands to the extent of not less than one hundred dollars in each year for each licence included in such group.

(b) Provided, also, that the lessee shall pay a royalty of five cents per ton upon every ton of merchantable coal and 2½ cents per barrel, containing 35 imperial gallons, on all crude petroleum raised or gotten from the leased or granted premises.

(c) Provided, that the lease shall contain provisions binding the lessee to continuously carry on coal or pertroleum mining operations.

(d) Provided, also, that any number of persons, not exceeding ten, uniting in partnership for the purpose of holding and working adjoining coal or petroleum lands, shall be entitled to work such lands as a firm; and in such case it shall not be necessary for every leasehold to be worked separately, provided that work is carried on upon one of them to the extent of not less than $100 in each year for each lease.

Provided, also, that in the case of lands held under lease adjoining Crown-granted lands owned by the lessee of said lands, the grants to which convey the coal thereunder, such lessee shall have the option of grouping nine adjoining leases with such Crown-granted lands and of performing on such Crown-granted lands the work required to be performed by this section upon lands held under lease; such work to be performed to the

satisfaction of the Minister of Lands to the extent of not less than two hundred and fifty dollars in each year for each lease included in such group; and provided such lessee can prove to the satisfaction of the Minister of Lands that there are reasonable grounds for believing that coal exists under said lands held under lease: Provided that in the case of lands covered by water, the lease shall contain a provision that the same may be grouped with Crown-granted lands adjoining one or more of the leaseholds to be grouped; and in such case it shall not be necessary to work such leaseholds, provided work is carried on upon such Crown-granted lands to the satisfaction of the Minister of Lands and to the extent of not less than two hundred and fifty dollars in each year for each lease; and such persons or incorporated companies shall be entitled to group the leaseholds held by them in the same manner as leaseholds may be grouped together or worked together in partnership.

(e) Provided, also, that if any person or incorporated company shall hold more than one lease which adjoin each other, it shall not be necessary to each leasehold to be worked separately, provided work is carried on upon any one of them to the satisfaction of the Minister of Lands, and to the extent of not less than one hundred dollars in each year for each lease; but this provision shall not apply to more than ten of such leases.

(f) It shall be lawful for the Lieutenant-Governor in Council, where coal has not been discovered within the boundaries of a licence, to grant a lease of such ground, provided sufficient proof has been submitted to the satisfaction of the Minister of Lands that coal has been discovered on lands owned by the licensee adjoining or contiguous to such licence in the Crown grant of which the coal underlying said lands has passed to the grantee, and provided that evidence satisfactory to the Minister of Lands has been produced proving that there are reasonable grounds for believing that coal exists under said lands held under licence.

7. Every applicant who proves to the satisfaction of the Minister of Lands that he has prospected for coal or petroleum during the term of one year, and that he has expended not less than $50 in such exploration work, shall be entitled to an extension for a second period of one year upon payment of one hundred dollars for each and every licensee. An extension of the term for a third period of one year may be granted on like conditions.

Provided, also, that in lieu of such exploration work, such licence-holder who has had the land included in his licence surveyed, and has filed in the office of the Minister of Lands a declaration by a surveyor approved of and acting under instructions from the Minister of Lands, stating that he has surveyed such lands in the manner provided by subsection (*a*) of section 5 hereof, and has delivered to the Minister of Lands a plat of the

lands so surveyed and a copy of the original field-notes, and has delivered two copies of the plat and one copy of the field-notes to the licensee of such lands, then such licensee shall be entitled to have the cost of such survey (not being less than one hundred and fifty dollars) counted as work done on the lands so licensed as required by this section, and such licensee shall thereupon be relieved from doing further exploration work under such licence for a further period of three years thereafter.

(a) Provided, also, that it shall not be necessary for the members of a firm of partners not exceeding ten in number to prospect separately each adjoining land under lease; providing prospecting to the value of not less than $50 in each year for each licence is carried on upon the land covered by one of the said licences to the satisfaction of the Minister of Lands.

8. The holder of a prospecting license may use the timber and stone on the land included in such license for the purpose of mining operations and for the erection of buildings on such land.

9. In any application under the provisions of this Act regarding which any adverse claim or protest may have been lodged or objection taken, the Minister of Lands, or the Assistant Commissioner of Lands for the district when so directed by the Minister of Lands, or the Deputy Minister of Lands when so directed by the Minister of Lands, shall have power to hear, settle, and determine the rights of the adverse claimants, and to make such order in the premises as he may deem just, and for all and any of the purposes aforesaid he shall have full power to summon and examine under oath the parties and witnesses; but such decision and order, if made by an Assistant Commissioner (if any) or the Deputy Minister of Lands, shall be subject to review by the Minister of Lands, and subject to appeal as hereinafter provided: Provided that in case any dispute as to the staking arises, the right to the completion of the application may be recognized according to priority of such staking.

10. No prospecting license shall be transferred unless written notice is first given to the Minister of Lands.

11 and 12A. In the event of entry upon lands not belonging to the Crown, the licensee shall give adequate security, to the satisfaction of the Minister of Lands, for any loss or damages that may be caused by such entry.

Rights of Way

13. The proprietors of any mine may acquire any land that may be necessary to them for communication with the sea-shore, or any river, or public highway, together with a block of land not exceeding five acres at the terminus of such line of communication. Provided always, that the land so acquired shall be used only for trans-

porting, storing and shipping coal, and for receiving and transporting such materials, commodities and persons as may be essential to the successful transaction of the business of such mine.

14. The deed of conveyance of such lands shall not include the mineral rights thereunder.

15. Prior to the acquisition of such land, compensation shall be given to the person whose land shall be taken, and if the amount of such compensation and the quantity of land to be taken shall not be agreed upon between the owner and the proprietor of the mine, the mount thereof shall be ascertained by arbitration.

Inspection of Metalliferous Mines Act [a]

2. The Lieutenant-Governor in Council may appoint an Inspector of Metalliferous Mines, who shall be of at least seven years' practical experience in mining. The Provincial Mineralogist shall have the powers of and may exercise the function conferred on an Inspector of Metalliferous Mines by this Act.

3. The Inspector shall not report on mining properties or do private mining work under penalty of a fine of not less than $100 nor more than $1,000.

4. The Minister of Mines may order the Inspector to examine into and report to him the condition of any metalliferous mine in regard to the health and safety of the workmen employed. The mine owner or agent shall have the right to appeal to the Minister on any difference that may arise between him and the Inspector. On receipt of notice of any serious accident in any mine, the Minister of Mines shall instruct the Inspector to inquire into the cause of such accident.

5. The Minister shall instruct the Inspector to examine and report to him on the condition of the hoisting machinery, ropes, cages, the methods of timbering, stoping, appliances for extinguishing fires, ventilation, sanitation, storage of explosives, etc. The Inspector shall not give notice when such inspection shall be made.

6. Every owner or agent of any metalliferous mine shall admit the Inspector to such mine.

If the owner or agent refuses to admit the Inspector to such mine, or to render him necessary assistance for inspection, he shall be liable to a fine of not less than $10 nor more than $500 for each such refusal.

7. If the Inspector shall reveal any information in regard to ore bodies, chutes, course, or character of underground workings, or give any

[a] Chap. 134, R.S. 1897 as amended by Chap. 49, 1899. Chap. 37, 1901 and Chapter 35, 1909.

information or opinion respecting any mine obtained by him in making an inspection, he shall upon conviction be removed from office and fined a sum of not less than $100 nor more than $1,000.

8. If the Inspector shall find any matter dangerous or defective, so as in his opinion to threaten bodily injury to any person, he shall give notice in writing thereof to the owners and order the same to be remedied.

(a) The Inspector shall cause a copy of this notice to be posted at the mouth of the mine in order that the workmen may become aware of the contents thereof.

9. In case the owner or agent disregards such order, any court of competent jurisdiction on application or information of the Minister, may restrain, by civil action, the working of the mine until it is made to conform to the provisions of this Act.

10. The owner, agent or manager shall report to the Minister and Inspector the facts relating to all serious or fatal accidents occurring in connection with the working of the mine. The Inspector shall investigate and report to the Minister on the causes of such accidents.

11. The Lieutenant-Governor in Council may remove an Inspector from office for incompetency, neglect of duty or abuse of the privileges of his office.

Employment of Females and Children

12. No boy under 12 years of age, no woman or girl, and no Chinese or Japanese shall be employed in any mine to which this Act applies.

13. No person shall be employed underground more than eight hours in every twenty four.

14. The person in charge of machinery for hoisting and lowering men shall be at least 18 years of age; but such person shall not be a Chinese or Japanese.

(a) The manager shall keep a register of all the boys under 16 years of age, and of all the women and children employed at the mine.

Wages

15. Payment of wages to mine employees shall not be made in any public house.

Returns, Notices and Abandonments

15A. A monthly return of output shall be sent to the Department of Mines. Such return shall contain:

(a) The name of the mine, its extent in acres, and the name of the Mining Division in which it is situated.

(b) The name of the Company. If the same Company operates more than one mine in the same Mining Division, the returns may be given *en bloc*, but the names of all the mines must be specified.

(c) The quantity of ore shipped or treated during the previous month and the assay values thereof.

(d) Any other particulars deemed necessary by the Minister of Mines. Such returns shall be in the form prescribed by the Minister.

15C. The Lieutenant-Governor in Council may order such returns or a summary thereof, to be made public.

16. Yearly returns, specifying the quantity of ore wrought in such mine and the number of persons employed below and above ground, shall be made on or before Jan. 15th.

19. A notice of every accident specifying the character of the accident and the number and names of persons killed or injured, shall be sent to the Inspector. Notice of subsequent death caused by accident shall be sent to the Inspector within 24 hours after such death comes to the knowledge of the owner or agent.

20. Notice of the re-opening or abandonment of a mine shall be given to the Inspector within two months; provided that more than twelve persons are ordinarily employed below ground.

21. The top of all abandoned mines shall be securely fenced to prevent accidents.

22. The plans of abandoned mines shall be sent to the Minister. This section does not apply to any mine opened up by means of tunnels or adit levels, below which extend no workings in which water may accumulate. (These plans are not open to the public.)

Plans of Mines

23. A plan of the mine, showing the workings at least up to the last three months shall be kept at the office.

(1) The Inspector shall be permitted to examine such plan.

(2) The owner or agent who fails to keep such a plan, or refuses to allow it to be examined, or conceals any part of the workings shall be guilty of an offence against this Act.

(3) The Inspector may order a plan to be made.

Provided that this section shall apply only to a mine to which this Act applies, and in which more than twelve persons are ordinarily employed below ground.

23. Any adjoining owner may apply to the Inspector for the purpose of learning whether such mine is being worked into his territory.

Inspector's Report

24. The Inspector shall make an annual report to the Minister of Mines.

(1) The Minister may order a special report to be made with respect to any accidents in the mine.

General Rules

25. The following general rules shall, so far as may be reasonably practicable, be observed in every mine to which this Act applies.

Ventilation

(1) An adequate supply of pure air shall be constantly maintained in every mine to such an extent that all working places, roads, etc., shall be in a fit state for working in and passing through.

Explosives

(2) Explosives shall not be stored or thawed underground in the mine but shall be stored in a magazine. Such magazine shall be placed far enough from any shaft, tunnel or mine buildings as to insure their remaining intact in case of the explosion of the stock of explosives in the magazine.

(3) All explosives in excess of the amount required for a shift's work, shall be kept in the magazine.

(4) Each mine shall have a suitable device for thawing explosives, and such device shall be heated only by the use of hot water or steam.

(5) Oils, candles and other inflammable substances, fuse and detonators shall not be stored with explosives.

(6) An iron or steel rod shall not be used for tamping wadding on the explosives.

Fire Protection

(7) Every plant using steam in which the boiler, engine, blacksmith shop and shaft are in the same building, shall have a hose connection to the injector or feed pump.

Permanent buildings for housing boilers, engines and machinery shall be erected at a distance of not less than fifty feet from the mouth of any mine.

(8) In every mine where hoisting is employed, the following code of mine signals shall be used; but it shall be lawful for the Lieutenant-Governor in Council to alter such code of mine signals to suit conditions which may arise.

British Columbia Mine Signals

(8A) Printed copies of the code of signals shall be posted in the engine house, on the gallows frame, at the working station in the mine and elsewhere as the inspector may direct.

(9) The bell-rope shall be so constructed that signals may be sounded clearly at the surface from any station.

Hoisting and Landing Men

(10) The hoisting or lowering of employees at any mine shall be permitted or positively prohibited.

Every working vertical shaft in which persons are lowered or raised shall, if exceeding 300 feet in depth, be provided with a cage and guides, such cage to be provided with a hood and safety catches.

Daily Inspection of Mines

(11) A competent person, appointed for the purpose, shall daily inspect and examine all external parts of machinery, head gear, ropes, working places and levels, and, at least once in every week, examine the state of the shaft or incline by which people ascend or descend, and the guides, timbers and ladderways therein, and shall make a true report of such examination, and such report shall be recorded in a book kept at the mine for that purpose.

Shafts

(12) Every working shaft or incline which employees travel in, shall be of at least two compartments and shall be well timbered.

(13) The top of every shaft shall be covered or protected. All vertical shafts of a depth of a least fifty feet shall be provided with a cross-head and guide, and such cross-head shall descend as such shaft is sunk, so that at no time shall it be at a greater distance from the bottom of the shaft than 30 feet.

Stations

(14) Each station shall have a passage way around one side of the shaft where the level or drift extends both ways from the shaft.

Ladderways

(15) Ladders in a ladderway shall not be vertical or overhanging and shall be kept in good repair and have substantial platforms, at intervals of not more than 20 feet.

(16) The platform shall be covered with the exception of an opening large enough to permit the passage of a man.

(17) The ladderway in a shaft must be separated by a strong partition from the hoistway.

Winzes and Mill-Holes

(18) Each winze or mill-hole extending from one level to another shall be protected at the top by a cover or a guard rail.

Exits

(19) As soon as it is practicable each mine shall have two or more exits.

Timbering

(20) All shafts, tunnels, drifts and working places shall be kept secure.

No stope or drift shall be carried on in any shaft over 200 feet deep, unless a proper bulkhead is put in, or unless 15 feet of solid ground has been left between the stope or drift and the workmen engaged in the shaft.

Chain Ladder at Bottom of Shaft

(20A) A chain ladder 20 feet in length shall extend from the bottom of the wooden ladder to the bottom of the shaft.

Gauges on Steam Boilers

(21) Every boiler shall be provided with a proper steam gauge, water gauge and safety valve.

Hours of Labor for Stationary Engineers

(21A) No engineer in charge of machinery operating for more than 20 hours, per day, shall be on duty for more than eight hours.

(21B) Any company that persuades an engineer to work more than eight hours per day shall be guilty of an offense against this Act.

Observance of Directions

22. Every person shall observe such directions with respect to working as may be given to him in order that the provisions of this Act may be complied with.

23. Every person who does not comply with any of the general rules of this section shall be guilty of an offense against this Act; and in the event of the non-compliance with the general rules applying to the mine, by any employee whatsoever, the owner, agent and manager shall each be guilty of an offense against this Act unless he proves that he has taken all reasonable means to prevent such non-compliance.

26. The Lieutenant-Governor in Council may, from time to time, make rules for the safety of the mines and protection of the miners; and these rules shall have the force of a law after they have been advertised for four weeks in the British Columbia Gazette.

Penalties

27 and 28. Every owner, agent, manager or lessee of a mine, or employee who is guilty of any act of omission in contravention of the provisions of this Act, shall be deemed guilty of an offence against this Act.

29. The penalty for an offence against this Act is $100 for a manager or agent and $10 for any other person; and if the Inspector has given written notice of any such offence, then the owner shall be liable to a further penalty not exceeding $100 and not less than $10 for every day after such notice that such offence continues to be committed, and in cases of other persons, to a further penalty not exceeding $5 per day.

30. In cases where the offence committed endangers the safety of the persons employed in or about the mine, the Court may exact imprisonment with or without hard labour, for a period not exceeding three months.

34. No prosecution shall be instituted against the owner, agent, manager or lessee of a mine for any offence against this Act except by an Inspector, or with the consent in writing of the Minister of Mines.

NEW BRUNSWICK

Gold and Silver Mines

The General Mining Act [a]

7. The Lieutenant-Governor in Council may declare a locality a Gold District.

8. Quartz mines are to be laid off in rectangles 150 feet magnetic E.—W. by 250 feet N.—S. (Class No. 1).

10. Alluvial mines are to be laid out as near as possible as directed in the manner prescribed for quartz mines.

13, 14, 15. Applications for leases are to be made to the Surveyor General and shall be accompanied by a fee of $2 for each area and this fee shall be considered as payment in advance for the first year. The fee per area during the next year is 50c.

16. The holder of a lease must remunerate the holder of private lands for any damage done. In case of non-agreement of terms, arbitration must be resorted to.

26, 27. All leases shall be for a term of 20 years and may be forfeited on account of non-payment of royalties or non-performance of required labour.

28. The holder of any mining lease can use only the surface for the erection of mine buildings, and other work pertaining to mining. All water courses are reserved to the Crown.

29. The Lieutenant-Governor in Council may regulate the number of days' labour required to be performed on the area under lease.

30. The titles of forfeited leases shall become vested in the Crown.

31. Any person staking off any area not lying within a proclaimed Gold District and not exceeding one hundred areas of Class No. 1, shall be entitled to a license or lease.

Licenses to Search for Gold and Silver

32. Prospecting licenses may be issued by the Surveyor General. Each such license may include an area not exceeding 100 areas of Class No. 1 and not less than 10 areas. The length of the quadrilateral and rectangular figures so laid off

[a] Consolidated statutes of 1903 and amendments up to and including March, 1910.

must not exceed double the breadth. Any applicant may apply for one or more such licenses.

34. Such license shall be in force for a period not more than one year from date of application therefor.

35. All applications for prospecting shall define, by metes and bounds, the land applied for, and shall be accompanied by a payment of 50c. per area up to 10 areas, and of 25c. for every additional area.

36. The applicant must give bond as a security for recompense to the proprietor of the soil for any damage done to the soil.

37. The proprietor of private lands so entered must seek damages within 3 months after the expiration of the license.

38. A licensee fulfilling all the obligations is entitled to a renewal for 12 months, upon like terms, except that the price of the same space shall only be half that paid on the previous application.

39. Within the license period a licensee may obtain a lease on any or all of the areas selected, provided he has complied with the working conditions.

40. No licensee may enter upon any lands occupied by buildings, or under cultivation or any orchard, except with the consent of the occupier or of the Lieutenant-Governor in Council.

Royalty on Gold and Silver

41. In all leases of gold and gold and silver mines, and prospecting licenses to search for gold or silver, there shall be reserved a royalty of 2½ per cent. upon the gross amount of gold and silver mined.

Licensed Mills

42. All mills must be licensed.

43. Before any license shall be granted a bond for two thousand dollars must be given as a guarantee that this chapter will be complied with.

44. Mill owners must keep a book of accounts, to be supplied by the Surveyor General, in which shall be entered a statement of all quartz or other material reduced or concentrated at such licensed mill, and the following particulars in respect of the same:

(1) The name of the owner of each lot of quartz crushed.
(2) The weight of each lot.
(3) The date of crushing the same.
(4) The actual yield of gold and silver.
(5) The royalty thereon.
(6) The number of the lease of the mine from which each lot was raised.

45-47. Monthly returns must be filed with the Surveyor-General.

Requirements of Lessees and Licensees

56. Quarterly returns on forms supplied by the Department must be made to the Crown Land's office in good time.

57. The lessees and licensees are liable for royalty upon gold and silver obtained in any other way than from licensed mills.

Unlawful Entry and Working

69. The Surveyor General shall have the power to remove any person from unlawful possession or occupation of a mine.

70, 71. Any person who shall unlawfully mine for minerals shall be liable to a penalty of not less than $10 nor more than $50 for each day he shall unlawfully mine; but this section shall not extend to parties prospecting or searching for mines.

72. On complaint in writing, the Justice of the Peace of the county shall investigate the complaint of such unlawful mining or entry to mine; and in case he shall find the party guilty he shall impose fines and penalties provided by this Chapter.

73. Such decision shall be subject to appeal upon the appellant giving the necessary bond.

76. Any party aggrieved by a decision of the Surveyor General respecting any application for a prospecting license or a lease of a gold area or a gold and silver area, or a license to search, or a license to work in any area, other than a gold or gold and silver area, may appeal from such decision to the Lieutenant-Governor in Council.

Mines Other Than Gold and Silver Mines

Licenses to Search and Work

79. Licenses to search shall be in force for 1½ years. Before a license will be granted, a bond must be given to to the Surveyor General as a surety in case an entry is made upon private lands.

80. The fee for a license is $20 and the license is given to search for minerals other than gold or silver over an area of five square miles, not more than 2½ miles in length and rectangular in shape with the lines running magnetic N.—S. and E.—W.

81. The Surveyor General may order the land surveyed and laid off at the applicant's expense.

83. Second rights of search may be given over the same area; but they shall be subject to the first rights, and the license shall not issue until the expiry of the first rights.

84. Damages are the same as are imposed in the case of for gold and silver.

85. A licensee may select 1 sq. mile at any time during the period of license for the purpose of working the minerals thereon. The application for this must be accompanied by a fee of $50 and must be made to the Surveyor General.

89. Every license to work is for a term of two years and shall be extended to 3 years by the additional payment of half the license price. Within this term actual mining work must be done and continued throughout the term.

90. Any persom may apply for a license to work without having previously obtained a license to search.

91. The holder of a license to work, having complied with all the terms, shall be entitled to a lease.

Leases

92. All leases must be approved of by the Surveyor General.

94. Leases of mines, other than gold or gold and silver, shall be for a term of 20 years, and shall contain all the conditions, provisions, provisos, and reservations usually contained in such leases or that may be required for the safe working of such areas. The annual rent, royalties, etc., shall be fixed by the Lieutenant-Governor in Council. With the exception of deposits of gypsum or carbonate of lime no lease shall be renewed or extended to a period beyond 80 years.

95. In the granting of leases, a 10-yard barrier running around the area shall be reserved on land. On water 25 yard barriers shall be reserved.

96. All transfers of rights must be made by the consent of the Surveyor General.

Corner Posts

99. All mining areas under lease for other than gold, or gold and silver, shall, within six months after the issuing of such leases, be marked by legal posts placed at each corner of the area.

The area of each lease shall be defined by survey according to priority of the granting of the lease.

Any lessee neglecting to set up the corner posts or monuments or to

renew the same when destroyed shall forfeit a sum not exceeding $100 for each unreplaced post.

Quarterly Returns

100. Not later than the tenth day of each of the months of January, April, July and October in each year, the owner, agent or manager of every mine (other than a gold, or gold and silver mine) leased from the Crown, shall send returns to the Surveyor General, specifying the quantity of mineral gotten in such mine, the use and destination of the same and the amount of royalty accrued on the same; and not later than the last day in the above mentioned months, returns shall also be sent specifying the number of days' labour and the number of persons employed both above and below ground, and the different classes of the persons so employed, and the cost and description of all shafts, quarries, slopes, levels, etc., opened or constructed, during the preceding quarter.

Royalties

101(a) Coal, 10c. per ton of 2,240 lbs.

(b) Bituminous shale, not exceeding 15c. per 2,240 lbs.

(c) Albertite, not exceeding $1 per 2,240 lbs.

(d) Copper, 4c. per unit in 2,352 lbs.

(e) Lead, 2c. per unit in 2,240 lbs.

(f) Iron, 5c. per ton of 2,240 lbs.

(g) Tin and precious stones, 5 per cent. of their value.

(h) Salt, 2c. per. bushel. No charge when brine contains less than 15 per cent. of salt in solution.

(i) Oil, 5 per cent. of value.

(j) Natural gas, 5 per cent. of output at mine.

(k) All other ores and minerals shall be subject to such royalties as shall from time to time be imposed by order of the Lieutenant-Governor in Council.

Renewals

105. Leases are given for 20 years and are renewable to 80 years at an annual rental in advance of $50 per sq. mile for all minerals excepting gold and silver, oil and natural gas and manganese, but rentals are not exacted if the royalty exceeds the annual rent.

106. The holder of any lease may at any time surrender the same by giving notice in writing.

Forfeiture

107. The Surveyor General may investigate and cancel all leases granted under this chapter for areas on which the working conditions have not been fulfilled or on which work has been abandoned.

111. Whenever a lease of a mine other than of gold or gold and silver, shall become forfeited, the Lieutenant-Governor in Council may direct that such mine shall be re-let or re-granted by the Surveyor General.

Manganese

114. In order to encourage a manganese industry the Lieutenant-Governor in Council may grant a special license for the exclusive right to search for wad or bog ores in New Brunswick.

While such special license is in force, no other license or lease will be given authorizing the licensee or lessee to explore or mine for wad or bog ores in this province. The licensee must expend $100,000 within 18 months for mining areas and working these ores, and not less than $500,000 within 5 years, from the date of issue. This right does not interfere with the mineral rights for minerals other than wad.

Subject to the provisions of this section, the Surveyor General shall have the power to grant to the owner of any land the right to search and mine for manganese therein.

By authority of Chap. X. 55 Vic. (Sec. 3) the following regulations are made to govern applications to mine manganese on granted lands.

That upon application, leases to mine manganese, be granted for ten years, (without first procuring a 'license to search'), to owners of farm lots at the annual rental in advance of five dollars for every 100 acres.

Also that manganese leases for tracts not exceeding one square mile be granted to the owner of the soil, for a period of ten years, on payment of an annual rental in advance of twenty-five dollars.

Before a lease is granted, a survey of the land applied for must be made, and a return thereof forwarded to the Crown land office.

When an application is made by a person other than the owner of the land, to mine manganese, and who is unable to arrange with said owner, the Surveyor General may notify said owner that he must, within 30 days, show cause why such application should not be granted, and if good cause be shown, then the Surveyor General may require the owner of such land to take out a lease, and on failure to do so within the time prescribed by the Surveyor General, a lease may issue to the applicant.

Oil and Natural Gas

2. In order that the oil and natural gas resources of the Province may be prospected and thoroughly explored the Lieutenant-Governor in Council may grant a license to search for oil and natural gas within an area or areas in the province of New Brunswick, to be specified in the license, to a company incorporated under the laws of the Province.

3. While the license giving the lessee the exclusive right to search for and mine oil and natural gas within a specified area, is outstanding, no other license or lease shall be issued authorizing another licensee to explore for or mine for oil or natural gas within such area.

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[a] Revised Statutes, 1903, Chap. 31.

4. The lease provided for in section 2 shall be granted for a period not exceeding five years.

5. The licensee shall, within two years, expend in boring for oil and natural gas not less than $20,000, and not less than $20,000 each year after the first two years, and not less than $100,000 in the whole within five years from the date of such license.

7. When any oil or natural gas well is opened up, such well shall be operated continuously to its full capacity so long as it can be operated at a profit of not less than 6 per cent. per annum on the cost of operating the same and disposing of the products thereof.

8. (1) The licensee may apply for a lease as herein provided, and in case at least one well can be operated at a profit, the Lieutenant-Governor in Council shall execute to the licensee a mining lease of an area not to exceed ten thousand square miles, to be selected by the licensee from the area covered by the license to search. Such lease shall be for a term not exceeding ninety-nine years, with a right of renewal for a further period of ninety-nine years, and contain a proviso for the forfeiture of the same, if and so soon as the lessee fails to continue to operate each well of oil or natural gas at any time discovered within the area and so long as the same can be operated at a profit of not less than 6 per cent. per annum. It shall also contain a proviso for forfeiture in case the royalty to the Crown be not punctually paid.

(2) Notwithstanding anything in sub-section (1) of this section, the Lieutenant-Governor in Council may, from time to time, permit the licensee to select portions of the 10,000 square miles, and grant leases for such portions until the whole area of 10,000 square miles shall be so selected, and leases issued therefor.

9. A royalty shall be paid to the Crown of an amount which shall not be less than five per cent of the output of oil and natural gas delivered at the well's mouth.

11. If, in boring for oil or natural gas, any other mine or mineral is discovered, the same shall belong to the Crown.

12. The lessee or licensee shall, when boring for oil or natural gas, be required to make an examination of the character of the water found in such borings. He shall supply full information as to the strength of any salt solution or deposit found, and shall furnish the Surveyor General with these records.

13. Neither the granting of such license to search nor the execution of such lease, shall prevent the Lieutenant-Governor in Council, or any licensee or lessee of the Crown, from prospecting for mines and minerals, other than for oil or natural gas, within the leased areas.

NOVA SCOTIA

PART I

The Mines Act[a]

4. OFFICERS.—The Governor in Council may from time to time appoint Deputy Commissioners of Mines, Inspectors of Mines, Deputy Inspectors and Mine Surveyors.

6. Within their districts, the Commissioners and Deputy Commissioners have the powers of justices of the peace, except those exercised and performed under the Chapter "Of Civil Procedure in Justices' Court."

7. The Inspectors shall periodically visit and inspect:

(a) All the mines belonging to, or under lease from the Crown.

(b) To ascertain that the laws and agreements relative to working of such mines, and payment of royalties, etc., are complied with, and that the mines are worked in an efficient and safe manner.

(c) To report to the Commissioner in regard to such matters.

8. The Deputy Commissioners and Inspectors hold office during pleasure and give security for faithful service.

9. No person holding the office of Provincial Secretary, Attorney-General, Commissioner, Inspector or Deputy Inspector, and no person in the employ of the Commissioner, and no person holding any office or employment in any of the government offices, the duties of which are usually performed at Halifax, shall, while holding such office or employment, directly or indirectly, apply for any license or lease, either for himself or any other person, or act as the agent or solicitor of any person so applying. The penalty for so doing is forfeiture of office and a fine of $1,000.

Licenses and Leases

12. The Commissioner, and in the case provided for in Part 2, the Deputy Commissioner, shall issue all licenses and leases.

All applications are made to the Commissioner, except those made as specified in Part 2, when they may be made to the Deputy.

14. Applications for license shall be made on Form A and for lease, on Form B.

15 and 17. No application shall be accepted for areas of ground already applied for or under lease or in dispute.

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[a] Revised Statutes, 1900, Chap. 18, with amendments up to and including the Acts of 1909.

16. The Commissioner shall cause the precise time of application to be endorsed on the application.

18. In the case of the Commissioner receiving two or more applications for license or lease at the same time for the same ground, the right to a license or lease of the ground shall be offered for sale at auction to the conflicting applicants. If such conflicting applicants do not offer any premiums above the usual price, the Commissioner may offer such rights at public auction.

19. Licenses shall be issued on forms C or D.

20. Upon request from persons having their applications rejected, the Commissioner may hold an investigation to determine,—

(a) The right to have such application accepted, or

(b) The matter of the claim of such licensee or lessee.

(c) Whenever the Commissioner deems an investigation necessary, he may order an enquiry to be made.

22. Every license shall bear the date of application, and every lease the date of July 2nd of the year in which application therefor was made.

23. Every lease executed on the part of the Crown shall be in duplicate and shall be made under the hand and seal of the office of the Commissioner, as well as under the hand and seal of the lessee. In the case of a lease executed by an attorney, such attorney must deposit in the Commissioner's office the documents conferring the power of attorney before such lease is executed.

24. The lessee must register one of the duplicates within one year from application.

25. The duplicate shall be registered and kept in the office. The original shall be delivered to the lessee with a certificate of the Commissioner endorsed thereon of the date and the year of such registration.

27. Leases may be obtained without a license having been previously applied for.

28. A license for gold or silver shall terminate one year from the time it is dated; and a license for minerals other than gold or silver shall terminate 18 months from the time it is dated. A lease for gold shall terminate 40 years from the time it is dated, and a license for coal shall terminate 20 years from its date of issue, with the option of three rewards making in all 80 years.

29. (1) Cost of prospecting under a license shall not be chargeable to the Government or Commissioner.

(2) The results of the work done under license shall be reported to the Commissioner.

30. No license or lease shall authorize the holder to enter upon any private house, orchards, etc., except by the consent of the occupant, or under license from the Governor in Council.

31. After one year every lease is non-forfeitable except for fraud, misrepresentation, non-payment of royalty or failure to comply with the provisions contained in the lease.

32. The penalty for mining without a license or lease ranges from $10 to $50 per day.

33. The Inspector or his agent may enter any lands to ascertain if mining is being carried on without a license.

34. The Commissioner may issue several licenses and leases to prospect for different minerals upon the same tract of ground.

35. In the case of forfeiture of lease, the Governor in Council may cause new terms to be inserted in a new lease of the same property.

36. A licensee or lessee may sell or transfer all or any portion of his share in a license or lease.

(2) Transfers are to be made in the manner indicated in Form F.

37. Surrender of lease must be made according to Form G.

38. The Commissioner may accept the surrender of two or more leases, and may issue one lease for all the surrendered areas.

42. All rents are payable in advance on July 2nd of each year.

If such rent is not paid within 30 days after such date, the lands covered by the lease shall be open for application for license or lease.

Royalties

45. (a) Gold and silver and tungsten, 2 per cent. of the gross value.

(b) Coal, 10c. per ton of 2,240 lbs. (Dominion Coal Co. and the Acadia Coal Co. pay 12½c. a ton.)

(c) Copper, 4c. per unit of 1 per cent. in 2,352 lbs.

(d) Lead, 2c. per unit of 1 per cent. in 2,240 lbs.

(e) Iron, 5c. on every ton of 2,240 lbs.

(f) Tin and precious stones and other minerals that are reserved, 5 per cent. of their value.

46. Every lease shall contain a provision that the royalties may be increased, diminished or otherwise changed by the legislature.

47. All royalties due the Crown shall bear interest at the rate of 5 per cent from the date they become due.

48. When the royalty paid on minerals mined in other than gold or gold and silver mines is greater than the rent in any one year, the lessee may receive upon application a refund of the annual rent.

50. The Crown may cause the sheriff to collect overdue royalties. All minerals upon which royalty is payable shall be weighed at the mine. One and a-half per cent is allowed for over-run.

51. Any lease may be forfeited for failure to pay royalties, or for non-compliance with the terms of the lease.

52. When it comes to the knowledge of the Commissioner that a lease is subject to forfeiture, the Commissioner shall inform the lessee in writing that an investigation is to be held within 30 days to enquire whether the lease shall be forfeited or not.

53. Upon receipt of the notice of the decision to forfeit a lease, the lessee shall cease all mining operations, but may, at any time within 30 days remove any buildings, machinery, plant, etc.

56A. In the case of a forfeited lease the Commissioner may take possession of such areas, plants, etc., on behalf of the Crown for the purpose of preserving the minerals in the interest of the King.

56B, 56C, and 56D. The Commissioner may cause such mine to be kept in working order; the expenditure to be borne by the Provincial Treasury.

56.E. The Commissioner shall have a lien upon the lease and plant for all expenses incurred in this manner. This lien does not require to be registered and shall have priority over all other liens or mortgages.

Licensee—Entry on Private Land

57. Every licensee may, subject to the provisions in this Chapter, enter upon private land covered by his license, and search for minerals.

58. The owner of such land, seeking compensation for damages, must, before the end of 3 months after expiration of license, serve the licensee with a notice in the Form K stating the particulars of damage and the amount of compensation claimed.

59, 60, 61. If within 10 days, the licensee does not pay the amount, arbitrators shall be appointed.

Lessee—Entry on Private Land

62. No lessee shall, except under the provisions of this Chapter, enter upon private lands without the consent of the owner.

63. When a lessee requires any lands, lakes, stream lands covered with water, for any of the following purposes, viz: mining, supplying water to mines, constructing roads, building miners' dwellings, constructing electric or power lines, power sites, etc., and no agreement has been made with the owner thereof for the purchase of these lands, lakes, streams, etc., the lessee may serve on the owner of the property a notice in writing which shall state:

(a) That he is a lessee under a certain lease.

(b) That he requires certain property, of which a plan and description is attached, and the tenure upon which the lessee desires to obtain such property.

(c) That he is willing to pay a certain price for the same and that he is ready to make an agreement respecting the same.

(d) That unless the price offered is not accepted by the owner within 10 days, the lessee will take proceedings under "The Mines Act" to acquire the property and to have the compensation fixed.

64. (1) If the lessee requires immediate possession of the property he may transmit to the Commissioner a duplicate copy of the plan and notice so served upon the owner, with an affidavit of service of a copy thereof upon the owner, together with an application on behalf of the lessee referring to such plan and notice and stating that the property referred to in the notice and plan is required for the purposes set out, and request that the Commissioner authorize the taking thereof for such purpose or purposes under this Chapter.

(2) The Commissioner shall inquire into the truth of such allegations and if be is satisfied thereof, shall grant a certificate declaring it to be necessary that the land shown on such plan should be acquired by the lessee.

(3) Upon the granting of such certificate and depositing with the Commissioner security for damage to the owner, the lessee may hold such lands.

(4) Upon the lessee paying the compensation to the owner, the Commissioner shall return to the lessee the security deposited with him.

65 If the owner and lessee, within 10 days after the serving of notice on the owner, mentioned in Sec. 63, fail to agree upon the compensation, the lessee shall serve a notice which shall give:

(a) A plan and description of property required.

(b) The tenure upon which the lessee desires to obtain such property.

(c) A declaration that the lessee is ready to pay a certain sum as compensation to the owner.

(d) The name of the appointed arbitrator.

(e) A demand for the owner to appoint an arbitrator.

74. (1) A lessee may obtain from the owner of land in the vicinity of the mine, the right of way for horses and servants, and may place on such land, works necessary to convey or discharge water.

(2) The lessee may also drive tunnels through such lands in order to reach the area contained in lease.

(4) Every lessee who requires to obtain such rights, mentioned in (1) and (2), and who has not made an agreement with the owner, may apply to the Governor in Council by petition.

(5) Such petition shall be verified by affidavit and shall set forth:

(a) The nature and extent of the rights required.

(b) The approximate position of proposed workings and tunnels, with plans of same.

(c) That the place selected for such workings is the most practicable and convenient with a view to causing as little damage as is consistent with the effective working of the area.

(d) Estimate of probable damage.

(e) That the lessee is willing to indemnify the owners for all damage caused by the exercise of the rights sought.

(6) This notice shall be served upon the owners 10 days before the hearing of the application.

(7), (8), (9), (10) The Governor in Council may grant or refuse the application; size of tunnels, etc. shall be determined by the Governor in Council; and awards for damages shall be determined by arbitration.

(11) A lessee shall not turn the course of any stream so as to deprive the inferior riparian owners of the use of such stream.

(12) Nothing in this Act shall affect the right to expropriate lands for mining purposes under sections 62, 63 and 74.

74(A). Subject to the provisions contained in this Act,

(1) Every lessee of a submarine tract may, for the purposes of ventilating, draining or mining the said submarine tract, make, use and maintain tunnels from any land belonging to him, or from any land acquired by him for mining purposes, to said submarine tract, through the said land acquired by him, and any intervening land, or land covered with water, belonging to any person or persons whatsoever, and also (notwithstanding anything contained in the Mines Act or other statute relating to mining) through any barriers, reserved under the provisions of the Mines Act, or under any leases heretofore or hereafter issued, or required under the provisions of the Coal Mines Regulation Act.

(2) Every lessee of a submarine tract who desires to acquire these rights shall first serve upon the lessee, through which the tunnels, etc., are to be maintained, a notice in writing which shall state as nearly as possible:

(a) That he is the lessee of a certain submarine tract.

(b) The general nature and extent of the rights that he desires.

(c) The number of tunnels to be made, their position, diversions, etc.

(d) That he is ready by agreement to define the rights, privileges, etc., and to fix and state the compensation to be paid therefor.

(e) That unless an agreement is made within thirty days, he will apply to the Governor in Council for an Order in Council vesting such rights, privileges, etc.

74B. (1) If the lessee of such submarine tract fails to come to an agreement with the lessee through whose land the tunnel is to pass, he may make application to the Governor in Council for the granting of these rights.

(2) Such application shall be accompanied by general plans and shall set forth:

(a) The lease or leases covering the said submarine tract owned by the petitioner.

(b) A description of the land held by the petitioner.

(c) The general extent of the rights and privileges required.

(d) The number of tunnels to be made, their size, direction, etc.

(e) The names of the owners of the intervening land and land covered with water, and the lessees of the mines and minerals through which said tunnels are proposed to be made.

(f) That he has served the required notice (of which copies must be produced) on such lessee or lessees, but has failed to make an agreement for acquiring the rights, privileges, easements and powers applied for, within thirty days from the service of such notice.

(3) Notice of such application shall be served upon the lessees of the mines.

74C. Upon the hearing of such application the Governor in Council may investigate and determine the matter.

74D. (1) The Governor in Council after hearing the evidence adduced, may decide regarding such application and by an Order in Council may vest in the lessee the rights, privileges and easements applied for, and may also state the direction, number and size of the tunnels to be maintained.

(2) The lessee may exercise the same on the payment of the compensation hereinafter provided.

(3) All coal and other minerals mined in the making of such tunnels shall become the property of the lessee.

74F. The amount of compensation shall be fixed by the provisions of the Order in Council.

74G. Every licensee who obtains such Order in Council shall commence work upon one of such tunnels in a time to be specified by the Governor in Council.

74H. The Governor in Council may relieve any lessee who has obtained such Order in Council from the payment of part or all of the royalty due on any coal mined from such tunnel.

74I. The next eight preceding sections shall not apply to coal mining leases numbered 298, 299, 300, 301 and 302 respectively.

75. The lessee may obtain additional land for mining purposes under the provisions of this Chapter in the same way as in the first instance.

User of Land

85. Every lessee shall use the land acquired by him for mining purposes, under this Chapter, in such a manner as is least injurious to the owner of such land.

86. The land shall be used only for mining purposes.

Rules and Regulations

123. The Governor in Council may make rules and regulations respecting the issue of licenses and leases under which the licensees or lessees may prospect, search or mine upon any area or tract of ground for mineral other than the minerals which a licensee or lessee may prospect, search or mine for under a license or lease covering such area or tract of ground in whole or in part.

(2) Such rules and regulations may prescribe:

(a) The number of such licenses or leases which the Commissioner may issue.

(b) The number of areas or the extent of the tract of ground to be covered by any one license or lease.

(c) The manner of laying out the ground.

(d) Conditions and terms.

(e) The different minerals included in the lease.

(f) The returns to be made to the Commissioner.

(3) Such leases shall not affect the previous lease.

Licensed Mills

127. All ore-dressing mills shall be licensed. The penalty for milling without a license is $400.

128. Before a mill license is granted the applicant shall give a bond for $2,000, conditional upon compliance with the requirements of this Chapter, such bond to be made out according to Form O.

129. Every mill licensee shall keep a book in which shall be entered a statement of all quartz or other material milled; there shall also be entered:

(a) The name of the owner of each parcel of ore milled.

(b) The weight of each parcel.

(c) The date of milling.

(d) The recovery of gold and silver.

(e) The royalty thereon calculated at 2 per cent.

(f) The property and the lease number of the same from which each parcel came.

(2) Every licensed mill owner who fails to keep a book shall forfeit his license.

130. Every mill licensee shall file each month with the Deputy Commissioner, a copy of the entries of such book.

131. Every mill licensee who fails to make correct returns shall be liable to a penalty of $50.

132. The penalty for fraudulent entry is $2,000.

135. Every mill licensee who complies with the provisions of this Chapter is entitled every 3 months to a sum equal to 5 per cent. upon the amount paid by him as royalty during that period.

Part II

Gold and Silver mines

147. The Governor in Council, on being satisfied of the discovery of gold, or gold and silver in any locality, may proclaim such a gold district by publishing the limits of same in the Royal Gazette.

148 and 149. Areas are to be laid off 250 feet in length, magnetic N.—S. and 150 feet E.—W.

150. Areas are to be laid out uniformly as far as possible and in rectangular shapes. Surface measurements are to be horizontal and areas are to be bounded by vertical planes passing through each side.

151. The length shall not exceed double the breadth.

Application for License or Lease

152. Applications for license or lease are to be made to the Deputy Commissioner.

150. Applications must specify the areas for license or lease and shall not be for less than 6 areas.

Applications for a license must be accompanied by a fee of 50c per area, and applications for lease by a fee of $2 per area.

155. No license, not an alluvial license, shall include more than 100 areas.

156. Every one fulfilling these conditions, staking the area and applying for a license in the prescribed time, shall be entitled to a license.

157. In the case of an area being private land the applicant must furnish a bond as a guarantee of compensation to the owner of the land for any damage done, to pay royalty, etc.

158 and 159. A prospecting license shall be in force for a period of 12 months from the date of application, and within this period the licensee may choose any area therein and be entitled to a lease of same.

160 & 162. The Commissioner may grant an alluvial license for 500 unlicensed or unleased areas, the width to be not less than 750 feet. The application must be accompanied by a fee of 10c. per area.

163. No application shall be received between Dec. 1st and March 31st.

164. An alluvial license shall be in force for 3 months between March 31st and Dec. 1st of each year.

165. The holder of an alluvial license on expending 40c. per area on actual gold washing or testing, and paying royalty on gold, shall be entitled to a prospecting license over the territory. The fee for such license is $250.

167. Such license is good for 12 months.

171. Every lease is good for a term of 40 years. (See sub-section 2 —expired leases).

Surveys

The Commissioner may order a leased area to be surveyed at the expense of the lessee.

176. Every surveyor shall administer oaths to the persons employed by him to assist in making the survey, binding them to the due and faithful performance of their duties.

177. In any district where at least one hundred contiguous areas have been applied for, a licensee or lessee may request the Commissioner to establish a base line.

178. All areas in such district shall be laid off from this base line by lines parallel to the same or at right angles to it, or its course prolonged.

179. Every person who removes or defaces any such monument shall be liable to a penalty of not less than one hundred dollars and not exceeding five hundred dollars, for each offence.

180. The barriers are to be 10 feet.

181. The annual rent of lease shall be 50c. per area.

Annual Labour Required

182. Forty days' labour per year must be performed on each area under lease. Any lessee who holds 10 or more, but less than 20 areas in any district shall not be required to perform more than three-fourths of such number of days' labour per

area. Any lessee who holds twenty or more, but less than thirty areas in any one district shall not be required to perform more than one-half; and any lessee who holds thirty or more areas in any district shall not be required to perform more than one-fourth such number of days' labour per area.

183. A lessee having performed the requisite number of days' work within the year, and having made returns of same to the Commissioner, shall be entitled to a refund of the rent paid in advance for that year.

Returns by Lessees

185. A lessee must make to the Commissioner within 10 days after the first of April, July and October in every year, correct returns of:

(a). Number of days' labour performed on such area during the preceding quarter.

(b) & (c) Number of tons of quartz raised and to whom sold.

(d) & (e) The weight sent to a licensed mill and yield of such.

(f) The quantity of gold and silver recovered from the mine during the quarter.

(2) Returns shall be made according to Form S.

Part III

Mines other than Gold or Gold and Silver

A license means a license to search.

187. Every applicant for a license or lease shall state the mineral for which the right to search or mine is sought, and shall describe the ground sought.

188 & 189. Every application for a license or second rights must be accompanied by a payment of $30, and every application for a lease by $50.

190. A license may cover any tract not exceeding five square miles in area and not more than 2½ miles in width.

191. A lease may cover:

(a) For coal or iron, a tract not exceeding 1 square mile in area and not more than 2 miles in length.

(b) For copper or lead, a tract not exceeding one-half mile square in area and not more than 1 mile in length.

(c) For tin or precious stones, a tract not exceeding one-quarter square mile in area and not more than 1 mile in length.

(d) For the purpose of mining any other mineral, a tract of an extent and length to be determined by the Commissioner.

(e) The extent of a lease may be increased by the Governor in Council.

191A. Where a lease covers a piece of ground under water, the

Governor in Council reserves the right to allow the lessee to maintain a tunnel or shaft on other land for the purpose of winning the mineral under water.

192. Before a license is granted the applicant must furnish $800 bond as a guarantee of compensation to private landholders.

193. A license to search shall be in force for one year and six months from date of application.

194. At any time during this period, the licensee may select a tract of ground and obtain a lease for the same upon application from the Commissioner.

195. Such tract shall be surveyed and laid off at the applicant's expense.

196. It is lawful for the Commissioner to issue second rights licenses to search.

199. Every lease shall be for a term of 20 years.

201. A lease must be renewed within 30 days after its expiration, for another 20 years.

Miscellaneous

203. Transfers cannot be made without the consent of the Governor in Council.

208. The width of barriers shall be 10 yards for land and 25 yards for water.

211. A yearly rental of $30 must be paid in advance, except for the first year.

212. Correct quarterly returns in accordance with Form V must be made to the Commissioner before the 10th day of January, April, July and October.

213. Lessees of coal mining areas exchanging portions of their areas for the more convenient winning of coal must submit such agreements to the Commissioner of Public Works and Mines.

Coal Mines Regulation Act [a]

2. This Act shall apply to mines of coal, stratified ironstone, shale and fire clay.

CERTIFICATED MANAGERS AND OTHER OFFICIALS

5. Every mine shall be under the daily supervision of a manager.

[a] Passed April 16, 1908, amended by Chapter 50 and 51 Statutes of Nova Scotia, 1909.

(2) The underground workings shall be under the control of a certificated underground manager.

(3) A person shall not be qualified to be a manager, underground manager, overman, mine examiner, shot-firer or miner, unless he is the holder of a certificate under this Act.

(4) A mine must not be worked for more than 14 days without such manager, underground manager or overman.

(5) A mine having less than 30 persons employed underground shall, at the discretion of the Commissioner, be exempt from the provisions relating to the appointment of a manager.

6. A manager, underground manager or overman may have his certificate revoked on account of incompetency, negligence or drunkenness.

9. Certificates for competency for managers, underground managers and overmen shall be issued by the Commissioner upon the report of the Board of Examiners.

10. Such Board shall consist of—

(a) The Inspector of Mines.

(b) Two managers of mines.

(c) Three experienced miners.

(d) Two persons to be appointed by the Commissioner.

(e) Such Deputy Inspectors, as are at any time and from time to time required and are directed by the Inspector to act as members of the Board.

(3) The Province, for this purpose shall be divided into four districts: Cumberland, Pictou, Inverness, and Cape Breton. A Board shall be appointed from the Board of Examiners to examine all candidates in each division.

(4) The Governor in Council may make regulations concerning examinations.

11. The Governor in Council may appoint a Commission to examine any mine and to recommend what kind of lights shall be used.

12. The Board of Examiners shall draw up rules for examination.

14. A register shall be kept of all certificates granted under this Chapter.

Certificated Workmen

16. (1) No person not employed as a miner previous to March 11th, 1898, shall be permitted to cut, mine or extract coal, unless he has been employed for one year in a mine and holds a certificate to that effect from a board of examiners.

(2) No person shall be given charge of a "working face" in a mine who has not—

(a) been employed in a mine for one year; and

(b) been employed in a mine for one year as a miner and holds either:

(1) a certificate of service as a miner; or

(2) a certificate of competency as a miner granted by a board of examiners of workmen.

(3) A "shot-firer" must hold a certificate of competency.

Employment of Boys

18. No boy of or above 12 years and under the age of 16 years shall be employed in or about any mine below or on the surface for more than 54 hours per week, or more than 10 hours in any one day except in case of emergency.

19. No boy between 12 and 16 years of age shall be employed underground unless he can furnish a certificate from a teacher that he has completed a course of study up to the end of grade seven.

Payment of Wages

21. Wages shall not be paid in a bar, or any public house.

22. Miners on contract may be paid according to the weight of the mineral gotten out.

(2) Miners may be assessed for rock in the coal.

24. A check-weighman may be employed by the miners for weighing the coal. Every such check-weigher shall be a certificated miner of at least three years' service.

29. Miners and labourers in a mine shall be paid every 2 weeks.

Single Shafts

33. There shall be two shafts connecting the workings of the mine so that there may be a separate means of ingress and egress available to the persons employed in every seam.

(b) Such shafts must be at least 15 yards apart and there shall be a communication between which shall be not less than 4 feet high by 4 feet wide.

(c) Proper apparatus for raising and lowering persons at each such shaft or outlet shall be kept on the works, either in use or available for use.

35. The foregoing provisions of this Act with respect to shafts will not apply

(a) In the case of a new mine being opened,—

(1) To any working for the purpose of making a communication between two or more shafts, or

(2) To any working in the initial stage where not more than 20 persons are employed underground.

(b) To any proved mine so long as it is exempted by order of the Commissioner.

Returns and Notices

36. The mine owners must make yearly returns to the Inspector concerning the ventilation, splits, etc.

(2) The returns shall be on such forms as are prescribed by the Commissioner.

37. All accidents and explosions, must be reported to the Commissioner and to the Deputy Inspector for the district within 24 hours of their occurrence.

Abandoned Mines

39. Notice of abandonment must be given and all shafts shall be fenced.

40. A plan showing the boundaries of the workings must be sent to the Commissioner within 3 months of such abandonment.

Inspection

41. The Inspector shall have the following powers:

(a) To make inspections to ascertain if this Act is complied with;

(b) To enter, inspect and examine any mine at all reasonable times by day or night;

(c) To examine into the state and condition of any mine, its ventilation, and all matters and things connected with or relating to the safety of the persons employed in or about the mine;

(d) To exercise such powers as are necessary for carrying out the provisions of this Chapter.

42. An accurate mine plan must be kept in the office showing the workings up to at least three months previously.

(2) If requested by the Inspector such plan must be plotted to show the progress of the workings of the mine up to time of such production. The Inspector must be furnished with a copy should he desire it.

(3) A plan or tracing must be furnished the Inspector on or before April 1st showing the workings up to January 1st then last past.

43. If the Inspector finds any mine dangerous or defective, he shall notify the manager and require the same to be remedied; and unless the same is remedied the Inspector shall report to the Commissioner.

(2) If the manager objects to remedy the matter he may, within 10 days, send in his objection in writing to the Commissioner. The matter shall then be settled by arbitration.

44. In the case of an accident, the Commissioner may direct the Inspector to hold an investigation.

Coroner's Inquest

(1) In the case of an inquest on the body of any person whose death may have been caused by an explosion or accident the Coroner shall notify the Deputy Inspector, and in the case of

the non-arrival of the Inspector, the Coroner shall adjourn the inquest to enable the Inspector to be present.

(2) The Coroner must give the Commissioner or Deputy Inspector 4 days' notice before holding the adjourned inquest.

(4) The Inspector may examine any witness.

General Rules

1. All mines must have an adequate amount of ventilation.

2. If gas has been found during the preceding 12 months, the mine must be inspected by a certificated examiner within 5 hours of the commencement of each shift, and if gas has been found during the 3 preceding months, then the inspection must be made within 3 hours of the commencement of each shift, and such examiner shall make a report in writing to the manager concerning the conditions of the ventilation.

3. In every mine where gas has not been found during the past 12 months, an examiner must examine all the places with a safety lamp daily and make a report to the manager on the conditions found thereof so far as the ventilation and safety is concerned.

4. All entrances to places not working must be fenced off.

5. Firemen's or examiners' stations shall be appointed at the entrance to a mine or entrance to the different parts of the same, and no workman shall pass them until his place is declared to be safe.

6. When any part of the mine is dangerous all workmen must be withdrawn from the mine or from that part of the mine. The mine shall then be inspected by a competent man and a report made and recorded in a book kept for that purpose.

7. Safety lamps must be used in all workings which are approaching any place where gas may be encountered. Suchdamps must be locked. In any part of a mine where safety lamps are used, no person must have in his possession lucifer matches, keys for opening lamps or other appliances for striking a light.

7a. Every examiner shall at all times in the discharge of his duties as mine examiner use a locked safety lamp and shall in all cases, unless the Deputy Inspector permits otherwise, be accompanied by an employee who shall also use a similar lamp.

Explosives

8. Explosives shall not be stored in the mine or within 250 yards of the slope or shaft or at any place not approved of by the Inspector.

(2) They shall not be taken into the mine except in a secure canister containing not more than 6 pounds.

(3) There shall not be at one time more than one canister in any one working place.

(4) They shall not be in possession of any person in the mine during 2 months after inflammable gas has on three consecutive days been found in the mine in sufficient quantity to show in a safety lamp, except in the following cases:

(a) In cases of stonework or shaft sinking in which the ventilation is so managed as to pass into the return air; or

(b) When the persons ordinarily employed in a mine are out of the same.

(5) In any case in which any explosive is used under the next preceding sub-head, or in any mine during three months after inflammable gas has been found in sufficient quantity to show in a safety lamp, no shot shall be fired except by a certificated shot-firer, nor unless such person immediately before firing a shot has examined the place and the places contiguous thereto with a locked safety lamp and has found such places to be safe.

(6) The Commissioner upon representation being made to him in writing by the owner that the finding of gas in sufficient quantity to show in a safety lamp on three consecutive days was unusual and exceptional and that the mine is not dry or dusty, may cause an examination to be made by the Inspector and on being approved by Inspector the provisions of sub-head (4) shall apply to such mine only if gas is found to show in a safety lamp on two consecutive days in each of two consecutive weeks.

(7) If the Inspector together with any person experienced in the composition and use of explosives reports that any explosive is free from danger the Governor in Council may order that sub-head (4) shall not apply to such explosive until such time as such order is revoked.

(8) In the application of this rule a district having a separate air intake and return airway shall constitute a separate mine.

(9) No needle or tamping rod used in charging holes with gunpowder shall be used unless tipped with copper or copper alloy.

9. Where a place is liable to contain a dangerous accumulation of water the working approach shall not exceed 8 feet by 8 feet and bore holes must be driven 5 yards in advance.

10. Planes or hoistways more than 35 yards in length, upon which persons travel, must be equipped with a signal system and supplied with sufficient manholes.

11. Where the traffic drawn by horse exceeds 10 tons in any one hour and there is not 2 feet of standing room, places of refuge must be placed not less than 25 yards apart.

(2) Where the load is drawn by machinery and there is not 2 feet of standing room manholes or places of refuge must be placed not less than 15 yards apart.

(3) The Inspector may require a separate travelling way to be constructed for the men to travel on.

12. Manholes or places of refuge must be whitewashed and kept clean.

13. When not in use the top of every shaft shall be fenced.

14. The top and entrances between the top and bottom of all shafts are to be fenced, but the fences may be removed temporarily.

15. Where strata is unsafe all shafts shall be lined or cased.

16. All travelling roads must be secure.

17. Every working shaft exceeding 50 yards in depth shall be fitted with guides and a signal system.

18. Cages employed for lowering or raising persons must have a cover or hood.

19. A single linked chain shall not be used as a hoisting rope to raise or lower persons.

20. Hoist drums must have horns or flanges to prevent the rope slipping.

21. Every hoist used to hoist or lower persons shall be fitted with an adequate brake and an indicator.

22. An engine driver for hoisting or lowering persons must be at least 18 years of age.

(2) In the case of a horse-whim the driver must be at least 14 years of age.

23. Every fly-wheel or exposed part of a machine must be fenced.

24. All boilers must have a steam gauge, water gauge and safety valve.

25. Ladders must not be vertical or overhanging, such ladders to have platforms at intervals of not more than 20 yards.

26. If more than 12 persons are ordinarily employed underground, a dry house must be furnished, so that the men can change and dry their clothes.

27. The ladderway must be securely lined and separated from the hoisting way.

28. No person shall wilfully damage any fence, ladder, platform, or signal.

29. Every person shall observe such directions as are given to him with a view to complying with the provisions of this Chapter.

30. Head gear, ropes, machinery, etc., shall be examined by a competent person at least once in every 24 hours.

31. In any mine, whenever required by the Inspector, the coal during the operation of holeing or undercutting, shall be supported by sprags or wooden props, under the direction of a person appointed for that purpose.

32. The miners may employ two persons to inspect the mine.

33. The majority of the workmen may appoint a committee to examine the seat of any accident.

34. Ambulances or stretchers, splints and bandages shall be kept at the mine.

35. An engineer hoisting or lowering men must be a certificated engineer.

36. A cage used for hoisting men must have safety appliances.

37. Failure to comply with these general rules shall be deemed an offence against this Chapter.

Special Rules

47. The manager may submit for approval special rules, which, if accepted, become law for the mine.

Submarine Areas

54. (a) No submarine seam of coal shall be wrought under a less cover than 180 feet of solid measures; provided that the owner may drive passageways with a cover of not less than 100 feet of solid measures.

(b) Barriers shall be left 25 yards on each side of the boundary lines of every lease.

(c) Where there is less than 500 feet of cover in submarine areas the mine shall be laid off in districts with an area not greater than one-half of one square mile; barriers separating such districts shall be 30 yards in width and must not be pierced by more than four passageways 9 feet wide by 6 feet high.

(d) The length of the district parallel to the shore must be not greater than one mile.

(e) The proposed method for submarine working must first be submitted and approved of by the Inspector.

Penalties

57. Every owner, agent or overman who is guilty of an offence against this Chapter shall be liable to a penalty not exceeding $80, except as in this Act otherwise provided.

58. If such offence is committed by a person other than an owner, agent, manager or overman, the penalty shall be not less than $1 nor more than $8.

59. No prosecutions shall be instituted against any owner or agent, except:

(a). By the Inspector.

(b). With the consent in writing of the Commissioner.

(c). By some person appointed by the Commissioner, or

(d). By some person employed about the mine in respect to which the offence was committed.

Metalliferous Mines Regulations [a]

2. This Act applies to all mines other than those to which the Coal Mines Regulation Act applies.

Employment of Boys

5. No boy under 12 years of age shall be employed in or about a mine.

6. Boys over 12 and under 16 years of age shall not be employed for more than 54 hours per week, or for more than 10 hours in any one day.

7. Such boys must furnish certificates from a school teacher to show that they can read and write and are familiar with the rules of arithmetic, including division.

9. No wages shall be paid at public houses.

Notice of Accidents

12. Notices of all accidents shall be sent to the Commissioner by telephone or telegraph, or by the quickest mode of communication, within 8 hours next after such accidents.

Abandoned Mines

13. All abandoned shafts shall be fenced within 3 months after the abandonment of the mine; if so desired, a plan of the workings must be sent to the Commissioner.

Notice of Change of Ownership

14. In any case,

(a) where there is a change in the name of the mine, or a change of manager;

(b) where work of opening a mine is begun;

(c) where a shaft is abandoned;

[a] Chap. 20, R.S. of Nova Scotia, 1900, as amended by chap. 12 and chap. 13, 1909.

(d) where work is commenced after abandonment;
the owner or manager shall give notice to the Commissioner to that effect.

(a) Any mine employing not more than 12 men is exempted from compliance with this section.

Inspection 15. Inspectors have power:

(a) To make an examination to ascertain if the provisions of this Act are complied with;

(b) To enter and inspect a mine at any reasonable time;

(c) To examine into the condition of the mine and its ventilation;

(d) To exercise such other powers as are ncessary for carrying this Chapter into effect.

16. If the Inspector finds any part of the mine dangerous, he may require the manager to remedy the same. If the same is not remedied, the Inspector shall report to the Commissioner.

(2) If the manager objects, he must send his written objections to the Commissioner within 10 days, and thereupon the matter shall be settled by arbitration.

17. A mine plan plotted up to 6 months previously shall be kept in the office. The Inspector may request a copy of same.

18. The Commissioner may order the Inspector to make a formal investigation of any mine accident.

General Rules

1. Adequate ventilation shall be constantly maintained in every mine.

2. Use of explosives:

(a) They shall not be stored in the mine.

(b) They shall not be taken into any mine, in which more than twelve men are employed, in quantities exceeding the requirements of one day, and not in any case exceeding fifty pounds.

(c) Explosives must be under the special charge of one man and the firing of the explosives shall be under the control of some man specially appointed for that purpose.

3. No person shall be in charge of a machine used for hoisting men unless he is at least 18 years old.

(2) A driver of a horse-whim must be at least 14 years old.

4. Workings approaching a dangerous accumulation of water shall not exceed 8 feet by 8 feet and bore holes must be kept at least 5 yards in advance.

5. Slopes and travelling ways shall have proper manholes. The main-hoisting slope must also have a signal system.

6. Every back balance, if exceeding 30 yards in length, shall be equipped with a signal system.

7. Travelling ways that have a traffic exceeding 10 tons in any one hour must have sufficient manholes.

8. Manholes shall be kept free and clean.

9. Unused shafts shall be fenced.

10. Entrances to shaft at top and bottom shall be temporarily fenced.

11. Where the strata is unsafe all shafts must be lined and secure.

12. Where the strata is unsafe all travelling roads shall be made secure.

13. Every shaft 50 yards or more in depth, used for hoisting and lowering persons shall be equipped with guides and a proper signal system.

14. Cages used for hoisting and lowering men shall be equipped with hoods or covers.

15. A single linked chain shall not be used as a hoist rope for hoisting or lowering persons.

16. All drums shall be equipped with horns to prevent the rope from slipping.

17. Machines used to hoist persons shall have a suitable brake and indicator.

18. The exposed parts of machinery shall be fenced.

19. All steam boilers shall have water and steam gauges and a safety valve.

20. Ladders must not be vertical, and ladder platforms must be built not more than 20 feet apart.

21. If more than 12 persons are employed underground, dressing rooms must be furnished.

22. A travelling shaft or ladderway must be lined or separated from the hoistway.

24. Every person shall observe such directions with respect to working as are given to him with a view to complying with the provisions of this Chapter.

25. All head gear, shafts, etc., shall be inspected every 24 hours.

26. The workmen may elect two of their number to thoroughly inspect the mine. Such report shall be recorded in a book kept at the mine for that purpose.

27. The workmen may also appoint a person to examine the seat of any fatal accident.

Penalties

24. Every owner or agent who is guilty of an offence against this Act shall be liable to a penalty not exceeding $80.

25. Every person other than an owner or agent who is guilty of an offence against any of the provisions of this Chapter shall be liable to a penalty of $8.

26. Prosecutions shall be instituted

(a). By the Inspector, or

(b). With the consent in writing of the Commissioner, or

(c). By some person appointed by the Commissioner, or

(d). By some person employed in or about the mine in respect to which the offence was committed, the same to be appointed in writing to institute such prosecution, by not less than twelve persons so employed.

32. On or before the tenth day of each of the months of January, April, July and October in each year, every owner or agent shall make correct returns to the Commissioner on the forms provided for that purpose.

ONTARIO

Part I—Preliminary

Mining Act of Ontario[a]

3. This Act does not interfere with applications for mining land made previously to the passing of this Act. This Act does not interfere with any Land Act.

Mining Recorders

7. The Mining Recorder shall keep a record of all mining claims and working permits. The books are open for inspection on the payment of 10c. for each record that is searched. A map is kept up to date with all the recorded claims plotted on it.

10. Extracts from any entry in a recorder's book in court is considered as *prima facie* evidence.

[a] Chap. 21, Stat. of Ont. 1908, as amended in 1909 by 9 Ed. VII, chap. 17 and Section 31 of chap. 26.

11. The Minister may employ any professor, instructor or other person engaged in any educational or other institution whatsoever to investigate the mineral resources of the province.

General Provision as to Officers

12. No officer appointed under this Act can become interested in Crown lands or in any mining claim under pain of forfeiture of office and a fine of $500.

13. The Deputy Minister or Mineralogist cannot be served with a subpœna for any court.

(2) The Deputy Minister is not bound to divulge any information which is against the public interest or which might lead to a prejudice being made in case of litigation.

14. The Commissioner and every inspector are Justices of the Peace for every county and district in Ontario and the recorder has the same power in his division.

15. The recorder may appoint constables.

(2) The constable's salary shall be fixed by the recorder but shall not be more than $3 per day.

18. All records shall be filed in the district-recorder's office.

19. Where any part of the Province is not included in a Mining Division application shall be made to the Bureau of Mines.

20. Crown patent notices are to be sent to the Mining Division to which the grant pertains.

Licenses to Mine

22. No person or company can prospect for minerals without first obtaining a miner's license.

(2) An employee of a licensee performing clerical work or manual labour does not require to have a miner's license.

23. Anyone over 18 years old can obtain a license by paying the necessary fee.

(2) The license is valid from date of issue until 31st of March of the ensuing year.

(3) The license is effectual in Ontario and is not transferable.

(4) Licenses to companies are issued by the Minister or Deputy Minister.

(5) Licenses to partnerships or individuals are issued by the Minister or by any recorder.

(6) All companies must be incorporated under the laws of Ontario.

24. All licenses are numbered, the letter number designating the office which issued it.

25. A partnership license does not entitle any partner or employee to a license.

26. A person who is not a licensee cannot stake out a claim for the purpose of obtaining a working permit or a boring permit on behalf of a mining company or partnership.

27. All licenses may be renewed by payment of the necessary fee; renewals date from April 1st., and bear the same number as the original license.

28. Destroyed or lost licenses may be renewed by duplicate.

29. No person or company may hold more than one license.

30. Licenses must be produced upon demand and shown to the inspector or recorder.

33. A license may be revoked by the Minister for wilful contravention of this Act.

Part II—Mining Claims

34. Subject to conditions herein contained the holder of a miner's license may prospect for minerals and stake out a mining claim on any Crown lands or on any lands on which the mines or minerals have been reserved by the Crown; provided the claim applied for is not at the time:

(a) Under staking or record as a mining claim which has not been abandoned or forfeited.

(b) Under a working permit.

(c) Withdrawn by an Act from prospecting.

Discoverer May Stake out a Claim

35. A licensee who discovers valuable mineral in place may stake for himself or may stake a claim on behalf of another licensee and, subject to other provisions of this Act, may work the same and transfer his interest to another licensee; but where the surface rights in the lands have been granted, sold, leased or located by the Crown, compensation must be made as provided in Section 104.

Lands not Open

36. No claims must be staked out upon the land vested in the Timiskaming & Northern Ontario Railway Commission without the consent of the Commission or of the Minister, nor upon land

(a) Reserved by the Crown for a town site.

(b) Laid out into town or village lots.

(c) Forming the station grounds or right of way of railways.

37. No person shall prospect upon any lot used as a garden or orchard, upon which the crops may be destroyed in so doing, or lots upon which springs, artificial reservoirs, dams or dwelling houses are situated, without the consent of the owner or by order of the recorder or Commissioner and then only upon such terms as the latter may consider just.

(2) In case of dispute between the prospector and owner, the recorder or the Commissioner shall determine the extent of the land which is so exempt.

38. A water-power capable of generating more than 150 H.P., at minimum flow lying within a claim does not belong to the claim and a road allowance of one claim in width shall be reserved on each side of the water, together with such additional land as, in the opinion of the recorder or the Commissioner, may be necessary for its development.

39. The Lieutenant-Governor in Council may withdraw any lands or mining rights the property of the Crown from prospecting; and may also re-open the same.

40. The Lieutenant-Governor in Council may direct that the mines and minerals so withdrawn may be worked by or on behalf of the Crown.

41. Lands so withdrawn remain so unless worked on behalf of the Crown, until re-opened for staking by Order in Council.

42. An officer appointed under this Act, on discovering valuable minerals upon lands open for prospecting, must stake a claim for the Crown.

43. Such land may be worked, leased or sold as provided by Order in Council.

Forest Reserves

44. No person shall prospect in a Crown Forest Reserve except in accordance with the provisions of the Forest Reserves Act.

45. No lands shall be sold for mining purposes in a Crown Forest Reserve.

46. A lease of land in a Crown Forest Reserve permitting mining operations therein may be made for a period not exceeding 10 years, with the right of perpetual renewals for periods of not more than 10 years.

Lands under Timber License

47. Any Crown land under timber license may be prospected and staked but the Minister shall decide whether mining operations shall be permitted to be carried on.

Sub-Section 3 of Section 187 applies to all regulations and the miner must re-imburse the holder of a timber license for all timber cut.

Prohibiting Mining Work

48. The Minister, whenever he deems it necessary for the protection of timber, or for other reasons, may prohibit the carrying on of mining work upon Crown lands.

Size and Form of Mining Claim

49. In unsurveyed territory, the boundaries of a claim shall run N-S and E-W astronomically. Horizontal measurements shall be made and the boundaries shall be vertical projections of the side lines. In territory surveyed into township lots, the claim shall be such part of a lot or quarter section.

Mining Claims not in a Special Mining Division

50. Except in a Special Mining Division a claim in un surveyed territory shall be a square of 40 acres; that is to say, 20 chains (1,320 feet) on each side.

Claims in Special Mining Division

51. The size of the claim shall be 20 acres; length N-S 20 chains (1,320 ft.), width E-W, 10 chains or 660 ft.

Irregular Areas

52. In unsurveyed territory an irregular portion of land lying between lands not open to staking or bordering on water may be staked as near as practicable to the prescribed form and area.

Number of Claims Allowed

53. In any one mining division not more than three claims may be staked out in the name of a licensee during a license year.

Staking out Claims

54. A mining claim shall be staked out by,—

(a) Erecting a discovery post on an outcrop of mineral. This post must bear the name of the licensee making the discovery, the letter and number of his license and the date of discovery, and if the discovery is made on behalf of another licensee for and in whose name the claim is to be staked out and recorded, the name of such licensee and the letter and number of his license.

(b) Four posts shall be erected at each corner and marked: Number 1 at the north-east corner; Number 2, south-east corner; Number 3, south-west corner; Number 4, north-west corner.

(c) A line must be blazed from post No. 1 to the discovery post, the distance to the discovery, together with all the information placed on the discovery post, must be marked on post No. 1.

(d) Posts Nos. 2, 3 and 4 must bear the name of the licensee making the discovery and, if the discovery is made on behalf of another licensee for and in whose name the claim is being staked out, also the name of such licensee; and

(e) The boundaries shall be cut out and a line from post No. 1 to the discovery clearly indicated by cutting out the line or erecting monuments.

(2) Where it is impossible to erect a corner post, a witness post shall be erected bearing the same marking as that of a corner post and marked W. P. and indicating by an arrow upon it the direction of the corner post location.

(3) Posts must be not less than 4 ft. above the ground, one foot of the top must be squared to about 4 in. All measurements shall be taken from the ground level of the post.

55. After making a discovery a discovery post should be erected and the claims staked out as soon as possbile.

56. Until a discovery post is planted, all prospectors have an equal right, but prospecting pickets may be erected if a prospector has reason to believe that mineral is present. Two pickets are placed not more than 150 feet apart and marked by trenches or monuments to show the direction of this line. As long as the prospector is diligently searching along this line and twenty-five feet on each side of this line, he has the exclusive right to prospect and make a discovery thereon.

(2) Any prospector can prospect outside these limits, but the first to make a discovery is entitled to the claim.

(3) A licensee shall not have more than one block of land picketed at one time.

57. A licensee who stakes out a claim and does not record it forfeits all right to it.

Recording Mining Claims

59. Fifteen days after staking a claim it must be recorded and a sketch map of the claim submitted to the recorder, together with an account of the measurements and marks placed on the posts.

The discovery of valuable mineral in place on a claim must be sworn to; also an account must be given of what the minerals consist of.

Where the claim is distant 10 miles or more from the recorder's office, for each additional 10 miles or fraction thereof an additional day shall be allowed for recording.

60. A licensee by or on whose behalf an application is made to record a mining claim shall at the time of application produce to the recorder the license of the licensee by whom the staking was done and of the licensee by or on whose behalf the application is made, and the recorder shall sign upon the back of the last-mentioned license a note in writing of the record of the claim, and no such record shall be complete until such endorsement is made.

62. The recorder must record all claims if they are made in accordance with this Act.

63. All disputes as to illegal recorded claims must be in the form of a copy left with the recorder.

A dispute shall not be received against a claim after a certificate of record has been granted.

64. Where a mining claim, not within a complete inspection area, has been recorded for 60 days and the discovery has not been adversely reported upon by an inspector, and where, in a complete inspection area, it has been recorded 60 days and the discovery has passed inspection, a certificate of record will be issued by the recorder.

65. The certificate of record shall be conclusive evidence of the fulfilment of the requirements of this Act (working conditions excepted).

66. A certificate of record issued by mistake or obtained by fraud can be revoked.

Extent of Rights in Mining Claims

67. A discovery of valuable mineral must be made on all claims before a licensee can acquire rights in a mining claim.

68. The staking of a claim gives the licensee only the right to proceed to obtain a certificate of record and patent from the Crown. Before a licensee gets a certificate of record he is merely a licensee of the Crown; after the issue of a certificate of record, and until he obtains a patent, he is a tenant at will of the Crown in respect of the mining claim.

69. Every application for a mining claim or working permit must be accompanied by the post office address of the applicant.

Trusts, Agreements and Transfers

70. Notice of a trust (obligation) relating to any unpatented mining claim shall not be entered on the records or received by the recorder.

71. No person can enforce any claim contracted before the staking out of a claim, unless the said person can show by a claim in writing, or by substantial evidence, that he is so entitled to do so.

72. A transfer of an unpatented mining claim or interest therein may be made in Form 11, and shall be signed by the transferer or his agent.

Recording Documents

73. The recorder shall make no record of transfers affecting a mining claim or any recorded rights unless such agreements are signed by the recorded holder of the claim and accompanied by an affidavit made by a subscribing witness to the instrument.

74. After a mining claim has been recorded, all other instruments, other than a will, will be void as against a subsequent purchaser or trans-

ferer, unless such instrument is recorded before the other instruments are recorded.

75. The recording of an instrument is a notice to all subsequent claimants.

76. Priority of recording shall prevail.

77. The recorder shall enter upon the record of any unpatented mining claim a note of any order or decision made by him affecting the same.

Working Conditions

78. The recorded holder of a mining claim shall do the following amount of work, consisting of stripping or other mining operations:

(a) Within 3 months of recording, 30 days' work of 8 hours each.

(b) During each of the first and second years following the expiration of such 3 months, 60 days of 8 hours.

(c) During the third year following the expiration of such 3 months, not less than 90 days of 8 hours; or a total of 240 days' work.

(2) The work may be done in a less time than that above stated.

(3) A report of such work, on Form 14 and accompanied by affidavit (Form 15), shall be made not later than 10 days after the specified time.

(4) The recorder, if satisfied that the prescribed work has been done, may grant a certificate (Form 16), but he shall first order an inspection, if he deems such advisable.

(5) A licensee may give notice, under Form 17, that it is his intention to perform all the work on one or two claims to cover the work on the three contiguous claims.

(6) The construction of houses or roads shall not constitute actual mining operations.

Computations of Time—Extension

79. The following time within which work upon a mining claim is required to be performed shall be excluded:

(a) All time by which an Order in Council or regulation is excluded.

(b) In a Forest Reserve the time elapsing between the delivery of an application to work to the Bureau of Mines and the granting of such.

(c) In the case of lands under timber license, the time during which working conditions are suspended under section 47.

(d) The time during which mining operations are prohibited by the Minister under section 48.

80. If, through pending proceedings or illness, the work is not performed the recorder may give an extension of time for performance of work.

81. Where two or more persons are the holders of an unpatented mining claim, each shall contribute to the work required in proportion to their interest.

82. A claim may be abandoned at any time by giving :

(1) Notice in writing (Form 18).

(2) The recorder shall enter a note of such abandonment.

83. Non-compliance with the provisions of this Act also constitutes an abandonment.

Forfeiture

84. Claims are forfeited if,—

(a) The license of the holder has expired and has not been renewed or has been obtained through fraud or other improper means.

(b) Prescribed work is not duly performed.

(c) Any report required under sub-section 3 of section 78 (non-recording of work), is not made and deposited with the recorder.

(d) Application and payment for the patent, required by section 106 and 107, are not made within the prescribed time.

(2) No person other than the Minister or an officer of the Bureau of Mines or another affected licensee can raise any question of forfeiture except by leave of the Commissioner.

85. Forfeiture or loss of rights under section 84 shall not take place for 3 months after default, if

(a) In a case under paragraph (a) the holder obtains a renewal of license.

(b) In a case under paragraph (c) the holder files a proper report, together with a special fee of $25.

(2) Where compliance with section 84 has been prevented by pending proceedings.

(3) All forfeited claims shall be marked by the recorder as cancelled and notice of such shall be posted in the office.

86. The Lieutenant-Governor in Council upon recommendation of the Minister may relieve against any forfeiture or loss under section 84 and re-invest the original owner with the rights under dispute.

87. In the case of joint holders where the interest of one has ceased by reason of the expiration of the license, if the Minister so directs such interests shall pass to the other holders.

88. In the case where a licensee dies after staking out and before recording a claim, or where he dies before a patent is issued, the claim cannot be re-staked within 12 months and the Commissioner may within such twelve months cause the claim to be vested in the representatives of the deceased.

Inspection of Claims

89. The Commissioner or the recorder may inspect or order the inspection of a mining claim at any time to see if the provisions of the Act have been complied with, but after a Certificate of Record has been granted no inspection of discovery can be made except by order of the Commissioner unless notice of the inspection has been given to the holder of claim at least 7 clear days prior thereto.

(2) In case of dispute, a Commissioner or recorder may order, with or without notice, an inspection of any mining claim.

90. Every Special Mining Division and every other part of Ontario which may be so designated by Order in Council shall be known as a "Complete Inspection Area."

(2) In a Complete Inspection Area no certificate of record will be granted until the inspection of the discovery has been made and allowed.

(3) An immediate inspection of the discovery may be directed if the same is applied for in writing.

(4) Upon the establishment of a new Complete Inspection Area all uninspected claims then existing there shall be subject to inspection.

(5) The limits of any Complete Inspection Area shall be published in the Ontario Gazette.

(6) The Order in Council for creating Complete Inspection Areas shall date from the first publication of the Ontario Gazette.

91. All reports of inspection shall be filed in the office of the recorder.

(2) If the inspection of a discovery is not accepted the claim is marked "cancelled" and the applicant is notified to that effect.

(3) An appeal from cancellation may be made under section 133.

(4) Claims cancelled are open to staking out, subject, of course, to the above mentioned appeal.

92. After an inspection of a discovery has been made and allowed and the proper time for appeal has elapsed the sufficiency of the discovery cannot be called in question again.

93. Copies of inspection reports may be obtained upon application and payment of the necessary fee.

Working Permits

94. A licensee may obtain a working permit by

(a) Staking out the boundaries of such area in the same manner as for a mining claim. The same data must be written on the posts omitting only what is provided in respect to discovery and discovery posts. Each post shall be notched with three rings. No. 1 post is to have written on it "Working permit applied for."

(b) Furnishing to the recorder within 15 days after the staking out an application in duplicate (Form 19) together with a map or plan in duplicate, indicating the location of the area, together with an affidavit, stating

the name of the licensee on whose behalf the application is made and the letter and number of his license and such other information as will enable the recorder to lay down the area on his office map.

(c) Procuring from the recorder a certificate of the application (Form 21) and securely affixing the same to No. 1 post within 3 days after the granting of the certificate.

(d) Paying to the owner of the surface rights (if such rights exist) compensation for any damage done.(See section 104).

(2) The working permit shall be issued within 70 days of the staking and shall be good for 6 months.

95. The recorder shall post up in his office a notice (Form 23) of every application for a working permit.

96. A licensee cannot hold more than 3 working permits in any one mining division.

97. Until a working permit has been granted and a notice of it has been affixed to post No. 1, the area is open to prospecting and staking out; but thereafter the holder of the working permit has the sole right to prospect and stake out that area.

98. A licensee is subject, to a great extent, to the same restrictions as exist in staking out and prospecting a claim.

Sections 34, 36 to 41, sub-section 3 of section 42; sections 44 to 52, 57, 58, 60 to 63, 69 to 77 and 79 to 89 are as far as possible applicable to an application for a working permit and to a working permit when granted.

99. Within two weeks after the granting of a working permit the holder shall begin to prospect the area. He must perform the equivalent of five days work per week for six months.

100. A working permit may be transferred and such transfer must be recorded.

101. A renewal of a working permit may be made for another six months subject to the same conditions as those under which the original permit was granted.

102. If the holder of a working permit makes a discovery of mineral on the area under permit he may stake out such as a claim and have it recorded.

103. The decision of the Commissioner with respect to working permits shall be final.

Surface Right Compensation

104. All licensees who prospect for mineral, stake or work a mining claim upon which the surface right belongs to someone else, must make compensation to the owner for all damage done.

(2) The Commissioner may order the giving of security for payment of the compensation.

(4) The compensation shall be a special lien upon the mining claim.

105. Where the surface rights have already been granted, the Commissioner may reduce the area of the mining claim.

Issue of Patent

106. Upon complying with the provisions of this Act and by payment of the purchase price of a mining claim the holder shall be entitled to a patent for the claim.

(2) The application (Form 27) for the patent must be made to the recorder within three years and six months from the date of the recording of the claim.

107. The price of Crown lands patented as a mining claim shall be at the rate of three dollars per acre in surveyed territory and two dollars and a half per acre in unsurveyed territory; and the price per acre for mining rights and quarry claims so patented shall be one-half the price of Crown lands.

108. A licensee who first discovers valuable mineral in place upon lands not in a Crown Forest Reserve, at a point not less than 5 miles from the nearest known mine or vein, and who has staked out a mining claim thereon and has complied with the requirements shall be entitled to a patent without payment of the price fixed in section 107.

109. In all patents for mining claims within the districts of Algoma, Thunder Bay, Rainy River, Manitoulin and Sudbury and that part of the district of Nipissing which lies north of the French river, lake Nipissing and the Mattawan river, there shall be a reservation made of 5 per cent. of the land granted and the Crown may lay out roads on such mining claims.

110. Every patent for Crown lands by which mines or mining rights are invested, shall state that it is issued in pursuance of this Act.

111. Every patent of Crown lands which is issued in pursuance of this Act shall vest to the patentee the Crown title in such lands and all the mines and minerals therein.

112. The pine trees are reserved by the Crown on all patents to mining claims but the holder may use what timber is necessary for fuel or mining purposes, but subject, as regards pine trees, to the payment of the value thereof to the Crown or to the timber licensee.

113. Before a patent will be issued for a mining claim in unsurveyed territory the claim must be surveyed by an Ontario Land Surveyor at the expense of the applicant and a plan of the claim with field notes must be filed with the recorder.

114. Upon application for a patent in a surveyed territory the Minister may order a survey to be made at the expense of the applicant.

115. The surveyor must send a certified plan and field notes of the survey to the recorder.

116. If on the completion of a survey, it is found that the area of a mining claim exceeds the prescribed acreage the Minister may direct the issue of a patent for a portion not exceeding the prescribed acreage.

PART III—PLACER MINING

117. A licensee who makes a discovery of a natural stratum of gravel carrying value of commercial importance may stake out and record a Placer Mining Claim. This staking out shall be similar to that for mining claims.

PART IV—QUARRY CLAIMS

118. A quarry claim may be staked out when not situated in a Complete Inspection Area or within a Special Mining division of Crown lands when proof is made that the deposit consists of valuable beds of limestone, marble or other economic products; but all valuable minerals shall be rereserved therefrom.

(2) No such staking out shall be done on any lands located, sold or patented under The Public Lands Act or the Free Grants and Homesteads Act or the Rainy River Free Grants and Homesteads Act, and such substances, unless expressly reserved, shall be deemed to have been conveyed by any patent issued previously or subsequently under any of the said Acts; provided that this section shall not affect any rights to these substances previously acquired on the lands.

(3) A quarry claim shall not interfere with the right of a licensee to stake out a mining claim on the lands embraced in the quarry claim and as against such licensee the holder of a quarry claim shall have the same rights as if he were the owner of the surface rights and the quarry claim was a claim in respect of mineral rights.

(4) Except as provided in sub-section 3, the rights of a quarry claim are the same as those of a mining claim.

PART V—PETROLEUM, GAS, COAL AND SALT

119. A licensee may obtain from the Minister a boring permit granting him the exclusive right for one year to prospect for petroleum, natural gas, coal or salt, upon an area of land open for prospecting and staking out in those portions of the Province lying north and west of the river Mattawan, lake Nipissing and the French river, by

(a) Staking out and numbering the posts according to section 54 and writing upon each post the words "Boring permit applied for," together with his name, letter and number of his license, the date of staking and on whose behalf the staking was done.

(b) Furnishing to the recorder an application in duplicate (Form 29) verified by affidavit within 15 days after the staking out.

(c) Forwarding to the Minister, not more than 90 days after, a plan or diagram showing the situation of the lands together with description of the same and a fee of $100; and

(d) Proving that he has secured the surface rights or agreed upon compensation for the same.

(2) One duplicate of the application shall be posted in the office of the recorder and the other forwarded to the Minister.

(4) The area of land if in unsurveyed territory, shall be rectangular and shall not exceed 640 acres, the boundaries to run E. and W., and N. and S.; and, if in surveyed territory it need not be rectangular but may consist of any number of contiguous lots or quarter-sections, not containing in all more than 640 acres.

(5) The holder of a boring permit shall commence work within 2 months of the granting of the permit and shall spend a sum not less than $2 per acre in searching for petroleum, natural gas, coal or salt.

(6) If the necessary expenditure has been made and other terms complied with the Minister may issue a renewal of a boring permit for one year on the payment of a fee of $100.

(7) The holder of a boring permit may, with the consent of the Minister endorsed thereon, transfer all his rights in the permit.

120. Upon the holder of a boring permit proving that he has discovered petroleum, natural gas, coal or salt upon the area, the Minister may direct a lease of the lands to be issued for a term of ten years at an annual rental of $1 per acre, payable in advance and subject to the expenditure of not less than $2 per acre per annum. The lessee has the right to a renewal of the lease for a further term of 10 years and then 20 years and so on.

(2) The Lieutenant-Governor in Council may make regulations as to leases and the lease shall be forfeited and void if the rental is not paid.

(3) The lessee has the right to dig, bore, sink or otherwise search for and remove petroleum, natural gas, coal or salt. All other valuable minerals are reserved to the Crown and may be staked in the usual manner under a miner's license but subject to compensating the lessee for any damage done (section 104).

(4) No such lease shall be issued in unsurveyed territory until a plan of the same is filed in triplicate.

(5) The holder of a boring permit or of a lease shall not be entitled

to the timber upon the land; but if the same is not already held by timber license, sold or patented under the Public Lands Act, The Grants and Homesteads Act or the Rainy River Free Grants and Homesteads Act, the holder of the lease by obtaining the permission of the Minister may cut and use the timber necessary for the performance of his work.

PART VI—DREDGING LEASES

121. The Lieutenant-Governor in Council may make regulations as to dredging leases.

(2) An annual rental of not less than $20 per mile shall be charged for the right to dredge on any such river, stream or lake. The lease extends over a period of 10 years and is renewable. Provisions may be made to protect public interests in the river, such as navigation.

PART VII—MINING PARTNERSHIPS

122. Two or more persons may form a mining partnership for the purpose of prospecting for minerals.

(3) After being recorded, a mining partnership shall be entitled to a miner's license.

(4) Contracts made by a recorded agent of a partnership are binding.

(5) The recorded agent's powers may be revoked by a vote of the majority of shares in the partnership.

(6) If a recorded agent dies, another may be appointed.

(7) A share in a mining partnership may be transferred.

(8) A person to whom a share is transferred must file the effect of the transfer in every office where the partnership is recorded.

(9) A mining partnership may be dissolved by the consent of all the co-partners.

(10, 11) A recorded agent is liable to the partnership for any breach of duty committed by him in disobeying the instructions given to him.

PART VIII—PROCEEDINGS BEFORE COMMISSIONER AND RECORDER

Powers of Commissioner

123. Claims, rights and disputes shall be determined by the Commissioner, except as provided by sections 182 and 183.

(2) Matters to be determined by the Commissioner are those

(a) In respect to an unpatented mining claim or quarry claim.

(b) As to the existence, validity or forfeiture of any unpatented mining claim or quarry claim.

(c) As to the boundaries and extent of the lands or rights included in unpatented mining claims.

(d) As to the right to possession of the rights to prospect or stake out any unpatented mining claim.

(e) As to any right claimed under regulations, made by the Lieutenant-Governor in Council, under the authority of sub-section 2, section 187.

(f) As to the rights any person has before transferring any unpatented claim.

124. A subpœna may issue out of the High Court or any County Court for the purpose of compelling the attendance of witnesses and production of documents before the Commissioner. The Commissioner also has the power to do the same.

125. The Commissioner shall have the power conferred upon an official referee by the Judicature Act or by the Arbitration Act.

126. The Commissioner has the power to make an order restraining any act which he considers ought not to be done.

127. The Commissioner shall also have all the powers which by *The Act to prevent Trespass on Public Lands*, are conferred on Commissioners appointed under the authority of that Act.

References and Transfers of Actions

128. The court upon application may refer actions to the Commissioner as an official referee.

129. Where proceedings are brought to the Court which should have been taken to the Commissioner the Court may transfer it to the Commissioner. There shall be no appeal from the decision of the Commissioner except as provided by this Act.

Powers of Recorder

130. A recorder, as to lands situate in his Mining Division, shall have the powers of a Commissioner under sections 123 and 124.

(2) The recorder may decide in the first instance any question arising prior to the record of a mining claim or working permit.

(3) The recorder shall keep a note of all decisions made by him.

(4) Every person affected by a decision made by a recorder may obtain a recorder's certificate of the decision.

(5) The recorder's decision is final unless appealed from as in this Act provided.

131. The recorder may direct proceedings before him.

(2) Where no directions are given the provisions relating to procedure before a Commissioner shall apply.

(3) The recorder shall not have power to award costs.

132. The order of a Commissioner or recorder may be considered as a judgment of the court.

133. An appeal may be made from the recorder to the Commissioner.

(2) In an appeal to the Commissioner, new evidence may be taken.

134. Appeals may be made to the Minister from the Commissioner in respect to any ministerial duty of the recorder.

Procedure before Commissioner

135. The words "The Mining Act of Ontario" shall be written on all notices, etc.

136. An appointment shall be obtained from the Commissioner for the hearing of all disputes mentioned in section 63 or of disputes regarding any claim, question or dispute cognizable by him.

137. The Commissioner may give all necessary directions for hearing any proceedings.

138. The Commissioner may obtain expert assistance.

139. The Commissioner may call for evidence or proceed on view.

140. The Commissioner shall give his decision upon the real merits of the case.

141. The Commissioner may order security for costs.

144. The evidence need not be written out unless demanded by the Commissioner or by a party to the proceedings.

145. The Commissioner may award costs.

146. The scale of costs not exceeding $400 shall be according to the tariff of the County Court; exceeding $400, to the tariff of the High Court.

(2) The Commissioner decides the scale of costs.

(3) The Commissioner has the same power with respect to counsel fees as a Judge of a County Court or a taxing officer of the Supreme Court.

147. Witness fees and conduct money shall be paid according to the County Court scale.

148. The decision shall be in the form of an order or award which shall be filed and a duplicate transmitted to the recorder.

149. The Commissioner shall make an entry of decision in his books and shall give a notice of final decision to the parties concerned.

150. Any party to a proceeding is entitled to a copy of an order or award.

Appeals from Commissioner

151. An appeal from the decisions of a Commissioner shall be made to the Divisional Court.

(2) In cases under The Arbitration Act, the order is final unless appealed within 15 days.

(5) The recorder shall transmit a record of the proceedings to the Central Office at Osgoode Hall, Toronto.

(6) Orders extending time of appeal shall be sent to recorder.

152. If the Divisional Court varies the decision of the Commissioner, within 30 days an appeal may be made to the Court of Appeals.

Validity of Proceedings

154. Proceedings under this Act are not removable by certiorari, etc.

155. Validity of proceedings shall not to be affected by informality.

Part IX—Operation of Mines

157. No boy under 15 years of age shall be employed underground; and no woman or girl shall be employed in mining work except for trimming mica.

158. No boy under 17 years of age shall be employed underground on a Sunday or for more than 8 hours per day. The time shall be deemed to begin at the time of leaving and to end at the time of returning to the surface.

159. The agent of a mine shall keep a register of all the boys employed.

160. No person shall have charge of an engine for hoisting men unless he is at least 21 years of age. If the hoisting is done by horse, then the driver must be at least 16 years of age.

161. A person neglecting the enforcement of the above four sections commits an offence against this Act.

162. All abandoned shafts must be fenced.

Inquest in Case of Fatality

163. A coroner shall hold an inquest in the case of a fatality in a mine. The Inspector and any other person authorized on his behalf shall be entitled to be present to examine any witness. If the Inspector or his representative is not present the Coroner before proceeding with the evidence shall adjourn the inquest and give the Deputy Minister not less than 4 days' notice of the time and place at which the evidence is to be taken.

General Rules

164. The following rules are to be observed:

Sanitation

1. There shall be adequate ventilation of shafts and adits.
2. If so ordered by the Inspector, privies shall be placed in the mine.

Care of Explosives

3. Magazines for explosives shall not be maintained nearer than 400 feet from the mine and works, and every magazine shall be constructed of such materials and in such a manner as to insure safety against explosion from any cause. A mound shall intervene between the magazine and the works.

4. No powder in excess of 24 hours' supply shall be stored in the mine. It shall be kept in securely covered and locked boxes and, where thawed underground, it shall be kept in unused parts of the mine, distant not less than 10 feet from traffic lines nor less than 150 feet from where drilling and blasting are carried on. At all times it shall be in charge of an experienced man.

5. No fuse, blasting caps, detonators or articles containing iron or steel shall be stored in the same magazine with the explosives.

6. A workman opening a box of explosives, or handling the same, shall not permit a lighted lamp or candle to approach within 5 feet of the explosives, nor permit the lamp or candle to be in such a position that the air current may convey sparks to the explosive.

7. Stores of explosives in the mine must be inspected daily, and the manager of the mine must report to the Inspector all negligent handling of explosives by workmen; and any employee who commits a careless act with an explosive, or omits to report immediately such act to an officer of the mine shall be guilty of an offence against this Act, and the officer in charge of the mine shall immediately report such offence to the Inspector or to the Crown Attorney of the district.

8. Thawing houses and apparatus for thawing explosives shall be separate from the mine buildings. A thawing house may be kept in the mine if approved of by the Inspector. The quantity of explosives brought into a thawing house shall not exceed the requirements of the mine for a period of 24 hours.

9. In charging holes for blasting, no iron or steel rod shall be used. No drilling shall be done in missed holes, nor shall any metal tool be introduced into the bottom of any such hole.

10. All missed holes shall be reported. A charge which has missed fire shall be blasted and not withdrawn.

11. The diameter of drill holes shall be greater than that of the explosive.

12. Dynamite or other explosives shall not be used to blast roast heaps.

Protection in Working Places

13. Manholes shall be provided, where men travel in the hoisting slope, at intervals of 20 yards, and every such slope which exceeds 30 yards in length shall also be equipped with a signal system.

14. Every road in the mine where the travel exceeds 10 tons in

any one hour shall be provided with manholes of sufficient size, not less than 100 yards apart.

15. Manholes shall be kept clean and accessible.

16. Where drifts extend from a shaft in opposite directions on the same level, a safe passage-way shall be made on one or both sides of the shaft.

17. In the case of a shaft sinking below a working level, a suitable pentice must be put in to protect shaft men from falling material.

18. The top of every shaft shall be fenced.

19. Guard rails shall be placed round the shaft at every level.

20. In the case of a bad roof, all tunnels, adits and shafts shall be properly timbered.

21. The mine must be equipped with suitable pumping machinery to handle all water.

Ascending and Descending Shafts

22. The working shaft must be divided by a proper lining from the ladder-way.

23. Workmen may not be hoisted or lowered in shafts or winzes in

(a) buckets, skips or tubs, except that men employed in shaft sinking shall be allowed to ascend and descend from the nearest level, but a ladder-way must always be provided;

(b) in cages which are not provided with a hood, dogs and other safety appliances;

(c) in cages without detaching hooks in mines of more than 1,000 feet in vertical depth;

(d) where hoisting engine has no indicator to show the position of the cage in the shaft;

(e) where the cable passes through blocks instead of properly designed sheave.

This rule (23) must be posted up at the mouth of the shaft.

24. Shafts over 400 feet in depth must be provided with safety cages to be used for hoisting and lowering men. All crossheads must be provided with a safety appliance so constructed that the crosshead cannot stick in the shaft without stopping the bucket.

25. Skipways that are inclined at more than 45 degrees must be provided with back timbers.

26. Hoisting with horse and pulley block is forbidden in shafts more than 75 feet deep.

27. Open hooks shall not be used in hoisting.

28. All hoisting drums must have flanges to prevent the slipping of the rope.

29. Every engine used to hoist or lower men shall be provided with a brake powerful enough to hold the full load in the shaft. In shafts

over 200 feet deep, such engine shall also be provided with a geared indicator.

30. No person shall ride on any loaded car in the mine.

Scaling—Escapement Shafts

31. The manager, or captain, shall examine all working shafts and stopes at least once a day, to see if they are safe, and cause all stopes to be scaled at least once a week. All scaling operations must be entered in a book and signed by the scaler.

32. A stretcher shall be kept to convey any injured person from the mine.

33. In all mines where the shaft is 100 feet deep and drifting has been carried on 200 feet from the shaft, and where the shaft house is not fireproof, there must be an escapement shaft other than the hoisting shafts.

34. Old mine timber shall not be piled in the mine.

35. All oils shall be stored in a building erected for that purpose. Such building shall be at a safe distance from the main buildings and powder magazine.

36. In a working shaft over 100 feet deep there must be some means of signalling from bottom to top and top to bottom.

37. A code of signals shall be posted in the engine house and shaft collar.

38. A suitable ladder-way must be kept in the shaft.

39. Where more than 10 persons to each shift are employed underground, a dry house or dressing room shall be provided.

Protection from Machinery

40. Every exposed dangerous part must be fenced.

41 and 42. Boilers must have safety valves, water gauges and steam gauges, and be cleaned at least every 6 months, and tested once every year.

44. In case of dispute on contiguous claims the Inspector will decide the time for blasting.

Posting up Rules

45. The rules posted shall be in language familiar to the workmen.

165. No wages must be paid in public houses.

Notice of Accidents

168. Notice of serious accident must be reported to the Deputy Minister of Mines within 24 hours of occurrence.

169. Notice must be given to the Deputy Minister of Mines of any changes in connection with the mine officers.

170. Annual and monthly returns must be made to the Minister.

171. Plans shall be produced if required by the Inspector when inspecting the mine.

An accurate plan of every working mine shall be filed with the Bureau of Mines on or before March 31st in each year showing the workings up to Dec. 31st next preceding.

Powers and Duties of Inspectors

172. The Inspector has power to do the following:

(a) Make such examinations and enquiries necessary to ascertain if this Act is complied with.

(b) Enter and inspect any portion of the mine.

(c) Examine and inquire into all conditions affecting the health and safety of the employees, give notice to the owner or agent and require any dangerous practice to be remedied.

(d) Stop the work when the mine is unsafe.

He has general powers for protection of miners and all other persons employed about the mine, smelters and metallurgical works.

He must make an annual report to the Minister to be laid before the Legislative Assembly.

173. The Minister may direct the Inspector to make a special Report on any accident.

(2) In conducting an inquiry the Inspector may take evidence and compel the attendance of witnesses.

174. Non-compliance with any rule contained in Section 164 shall be an offence against this Act, upon proof of which the owner and the agent of the mine and any contractor or foreman engaged in or about such mine shall each be guilty of an offence against this Act unless he establishes the fact that he has taken all reasonable means to prevent such non-compliance by publishing and, to the best of his power enforcing these rules.

175. Contractors must comply with this Act.

Part X.—Offences, Penalties and Prosecutions

176. Every person who is guilty of an offence against this Act shall incur a penalty not exceeding $20 per day for every day upon which the offence occurs, and upon conviction shall be liable to imprisonment for 3 months, unless the penalty and costs are sooner paid.

179. Every agent guilty of offence against Part IX shall incur a penalty of not less than $100 nor more than $1,000.

(2) Every person other than an owner or agent who is guilty of an offence against Part IX, shall incur a penalty of not less than $10 nor more than $100.

(3) For continuance of an offence after written notice has been given by the Inspector, the penalty shall not exceed $100 per day.

(4) Every owner or agent shall, upon conviction, be liable to imprisonment for 3 months, unless the penalty and costs are sooner paid. Persons other than owner or agent have the option of paying the fine with costs, or being imprisoned for one month.

(5) When the offence is one which endangers the safety of those employed and was committed through the negligence of the owner or other guilty parties, the penalty may be imprisonment for a period not exceeding three months with or without hard labour.

Part XI—General Provisions

184. Excepting in cities, towns, and incorporated villages liquor licenses are forbidden within 6 miles of the mine.

Quebec [a]

Privileges of Aliens and Reserve of Mining Rights

2099. Aliens, as well as British subjects may enjoy the benefit of this section by complying with its provisions.

2100. In future Crown grants it shall not be necessary to mention the reserve of mining rights.

2101. The mining rights, so reserved, are distinct and separate from the surface rights.

2102. All mines, except gold and silver, belonging to the Crown under the law or titles of concessions and situated under the lands conceded before July 24th, 1880, are abandoned by the Crown and belong exclusively to the owner of the surface, provided the latter has not divested himself of his right of pre-emption existing under the previous law. When the owner of the surface has divested himself of his right of pre-emption, the person acquiring such right shall have the first and exclusive privilege of mining in the mines so abandoned; but such person shall commence mining operations within six months after ore has been discovered in workable quantity.

2103. In grants of land made previously to July 24th, 1880, by simple location ticket for which letters-patent or similar titles have not been issued or which have been issued only after the above mentioned date, the gold and silver mines only belong to the Crown.

If the conditions of the location ticket are not fulfilled on this date, all mines shall belong to the Crown as if the grant of them had been made under the mining law of 1880.

[a] Revised Statutes of Quebec, 1909, as amended by Chap. 17, 1910, and Bill No. 11, 1911.

2104. If, while a mine belonging to the proprietor in virtue of any provision of the mining law, is being worked, other mineral belonging to the Crown is found, the proprietor shall have the first right to obtain the mining rights of the same.

Royalty

2105. The Lieutenant-Governor in Council may claim the royalty due to the Crown upon any land sold or alienated by the Crown. Such royalty, unless determined by letters-patent or other title from the Crown, shall be fixed by the Lieutenant-Governor in Council, in accordance with the report of the mining inspector, and in no case shall such royalty exceed three per cent. The royalty on asbestos, when imposed, shall be levied by taking as a basis the quantity and value of the asbestos produced, deducting such of the cost of the extraction and treatment as the mining inspector may think just and reasonable.

Mining Concessions, their Shape and Dimensions

2106. Mining concessions shall comprise, in addition to the ordinary allowance of 5 per cent for highways:

(1) In unsubdivided territory, a rectangular area of not more than two hundred nor less than 40 acres in sections of not less than 20 chains wide adjoining or separated from each other.

(2) In townships surveyed and subdivided, and in seigniories, an area of one or two lots taken separately or forming a single tract of land, as described in the plans; each concession shall not exceed 200 acres nor shall they contain portions of any other lot.

2107. In unsurveyed territory, the principal outside lines of the mining concessions must be drawn in a northerly and southerly and easterly and westerly direction.

2108. When mining concessions in unsurveyed territory border upon lakes or rivers they shall front on such lakes and rivers. A right of way of one-half chain in breadth, shall be reserved along such lakes and rivers and such allowance shall be comprised in the allowance mentioned in Sec. 2106.

2109. In unsurveyed territory all mining concessions shall be surveyed by a provincial land surveyor and be connected with some previous survey.

Such survey shall be made at the cost of the applicant, who must furnish, along with his application to purchase, the plan of the survey and the survey notes.

Acquisition of Mining Lands

2110. All Crown lands supposed to contain minerals may:

(1) Be acquired from the Minister as a mining concession by purchase, or

(2) Be occupied and worked under a mining license.

2111. Crown mining rights on private lands may be obtained in the same manner as indicated in article 2110.

2112. Every proprietor of mining lands, as well as every holder of a mining license or holder of claim within the meaning of sub-section 8 of this section may sell or transfer his rights by delivering to the Minister an authentic copy of the record of such sale or transfer. Upon payment of a fee of $10 the Minister shall register the same. Every transfer not so registered shall be null as regards the Crown.

Price of Mining Concessions

2113. Within a radius of one hundred miles not more than one mining concession forming more than two hundred acres, can be sold to any one person during the same year.

The Lieutenant-Governor in Council may nevertheless assign to such person, upon sufficient proof of capital being given, a greater area of land, but in no case exceeding one thousand acres.

2114. Upon submitting the application to purchase mining concessions and the necessary documents mentioned in this section, the applicant shall pay to the Department the price in full of the mining concessions he wishes to acquire. The rates shall be as follows: $10 per acre for superior metals the deposits of which are located more than 20 miles distant by wagon road from a railway, and $20 when located less than 20 miles distant; $2 per acre for inferior metals more than 20 miles distant by wagon road from a railway, and $4 when less than 20 miles distant. From these fees may be deducted the amount already paid for a mining license upon the same land. The fee of $10 for the issue of the license shall not be included.

2115. The Minister may at any time put up for sale any number of mining concessions. Such sales shall be by public auction and the upset price shall be fixed by the Minister but shall not be less than the total amount determined in accordance with Article 2114.

2116. Unless stipulated to the contrary in the letters-patent:

(1) In concessions for the mining of superior metals, the purchaser shall have the right to mine for all metals which may be found therein.

(2) In concessions for the mining of inferior metals, the purchaser shall have the right to mine for inferior metals only.

2117. In townships duly erected, as well as in unsurveyed territory, no lands will be sold under this section, unless real indications of the presence of minerals have been found thereon, and such specimens exhibited.

Cutting Timber on Mining Concessions

2118. The holders of licenses to cut timber shall have the privilege of cutting the same on all mining concessions granted within their limits. This privilege shall expire

after five years from the date of the issue of letters-patent for such mining concessions.

2119. The Crown reserves the timber upon all the lands not under timber license and sold as mining lands.

Timber licenses may be granted for the cutting of such timber.

The holder of a timber license may make and maintain roads across any mining lands.

The right to cut timber under a license, upon the mining lands mentioned in this article, shall expire after three years from the date of the issuing of the first license to cut timber upon such mining concessions.

2120. The proprietors of such mining concession shall have, in the case of Articles 2118 and 2119, upon paying the value of the white and red pine, the right to cut and take away what timber they require for their own use.

Cancelling Sales of Mining Lands

2121. Mining lands shall be sold on the conditions that mining operations be commenced within two years and the purchaser shall in such working, spend for superior metals not less than $500 for every section of 100 acres; and for inferior metals, not less than $200 for each such lot. If these conditions are not fulfilled the sale may be cancelled.

2121a. All mining land and mining concessions sold in conformity with the provisions of the Quebec Mining Law, and the letters patent whereof are issued after July 1st, 1911, shall be subject to an annual tax of ten cents per acre. The Minister shall remit this tax upon an affidavit being given to the effect that at least two hundred dollars have been spent in mining work upon the concession during the year.

Miner's Certificate

2122. The Minister may deliver a miner's certificate to any one applying for the same. Such certificate shall be valid from the date of issue to the first day of January next following.

2123. The fee for a certificate is $10.

2125. Any person holding a miner's certificate may prospect on all public lands or on private lands, whether surveyed or not, on which the mines belong to the Crown but not on any land which is already under claim, or under mining license or withdrawn from entry. The miner who wishes to prospect on private lands must give security subject to Minister's approval, to cover all injury or damage he may cause to the surface owner while prospecting the same.

Staking in Unsurveyed Territory

2126. A holder of a miner's certificate may stake out not more that five rectangular claims, each of which shall be of not less than 20 chains in width, and shall contain at least 40 acres. The total area shall not exceed 200 acres, and the sides shall run northward and southward, and eastward and westward.

Claims may be staked out as follows:

1. By planting a squared stake on a prominent point, indicating the discovery. Such stake shall bear, in very legible characters, the name of the discoverer, the number of his certificate and the date of the discovery;

2. By placing at the apex of each angle of the lot aforesaid, stakes numbered 1, 2, 3 and 4, the stake nearest the northeast point bearing the number 1, that nearest the southeast point, bearing the number 2, and so on;

3. By putting on stake number 1, the same inscriptions as those on the discovery stake and indicating the distance between those stakes;

4. The lines between such stakes, including that connecting the discovery stake with stake number 1, shall be visibly cut or indicated on the ground by blazing trees.

5. If it is impossible to plant a stake at one of the angles, owing to the configuration of the ground, such stake may be put at the nearest practicable point, by putting the following inscription upon it: W.P. (witness post) or P.I. (*piquet indicateur*) and an indication of the distance in the direction of the true point.

6. The length of the stakes shall be about four feet above the soil, and their diameter about four inches.

Staking in Surveyed Territory

2127. In surveyed territory, the holder of a certificate may stake out one or two claims of one hundred acres or of one lot each, by planting a discovery post in the manner mentioned in article 2126, the contours of the claim being sufficiently indicated by the lot itself, but subject to the right of marking out such boundaries if they are no longer visible. Nevertheless, if the lot is in the forest, the indications mentioned in article 2126 must be made at the apex of each angle.

2129. After a claim has been staked out, the Department of Mines should be notified at once.

2130. If the claim is admitted by the Department or by the officer, mention thereof shall be made on the back of the miner's certificate and also in the books of the Department.

2131. Within six months from the date inscribed on the stakes, on

pain of forfeiture of all rights, the holder of a certificate shall apply for a miner's license in accordance with article 2133.

Such application shall be accompanied:

(1) By the fee and rent;

(2) By a description of the lot with a sketch or plan and also an indication of the nearest land marks, such as lakes, rivers, surveys or dwellings, if any;

(3) By a solemn declaration attesting that such lot has not been previously marked out and is not under mining license, and giving all the data inscribed on the posts, and showing that he has made or caused to be made thereon, prospecting or development work equivalent to twenty-five days of eight hours each, the whole according to the form H.

The land covered by mining license shall be staked out in the same manner as a claim, except that the posts shall bear the initial letters M.L. (mining license) or P.E. (permis d'exploitation)

2131a. Every mining inspector or other official under this Act who discovers valuable mineral on lands, the mining rights of which belong to the Crown, shall stake the claim for the Crown. Claims staked out "For the Crown" may be worked, leased or sold by the Crown.

Mining Licenses

2132. Every person is prohibited, under pain of the penalty provided in article 2191, from mining upon any lands the mining rights of which belong to the Crown, without having previously purchased the same or without having obtained a mining license to that effect, and paid the fee and rent required by article 2134.

2133. There are two kinds of mining licenses:

(1) Private lands' license, where the mining rights belong to the Crown. (Form A.)

(2) Public lands' license. (Form B.)

2134. Mining licenses valid for one year shall be granted, on payment of a fee of $10 and an annual rental of fifty cents per acre, and an affidavit that the required work has been done.

Mining licenses are not transferable, except by consent of the Minister.

A license cannot be granted for more than 200 acres in surveyed territory, nor for less than 40 acres along a width of not less than 20 chains in unsurveyed territory, unless by virtue of article 2243.

2135. The Lieutenant-Governor in Council may require the payment of a royalty for a mining license in lieu of fees and rental, except, however, in places in which the royalty due to the Crown under letters-patent is paid by means of fees for mining licenses.

2138. The holder of a mining license or the owner of mining rights on private lands may work the mines thereon, either with the consent of such person, or compulsorily in the manner provided by articles 2139 to 2161 inclusive.

Miscellaneous Provisions re License Holders

2162. Upon the renewal of a mining license, the licensee shall make a true statement to the Inspector of the amount of work performed and the minerals obtained by him during the term of such license.

2163. Every owner of mining rights shall, during the first ten days of January in each year, furnish a sworn statement of his operations for the past year, mentioning the quantity of mineral extracted, its value at the mine, the quantity and value of the marketable product, and the number of workmen employed, as well as a list of the names of persons killed in working the mine.

2164. No title to a mining concession shall, without the formal consent of the proprietor of the soil, give a right to mine in fields, yards or gardens, or upon lands within 300 feet of any dwelling, house or boundary fence.

Mill or Machine License

A person wishing to use milling or concentrating machinery shall obtain beforehand a special license therefor.

The fee for such license is $5.00.

2169. Every licensed mill shall keep a book to show:

(1) The name of the owner of each distinct parcel of quartz crushed.

(2) The weight of each such parcel.

(3) The date of the crushing of the same.

(4) The actual yield in weight of mineral obtained from each such parcel or lot.

(5) The description of the mining land worked.

2170. Every mill owner shall, under penalties mentioned in article 2200, furnish monthly to the Inspector of the mining division, a return, under oath, compiled from the book containing the aforesaid statements and detail, for each and every day of the month then last past, together with such information as the Inspector or the Lieutenant-Governor in Council may require.

Mining Methods

2171. Party Walls or Passages.—A party wall or passage, at least 3 feet thick, shall be left between each holding, worked either on public or on private lands, and such passage shall be common to all parties.

2173. Damages Resulting from Mining Operations.—No person working mines shall cause any damage to any other mining land by throw-

ing stones, earth, etc., thereon, or allowing water to be pumped from his land on to other land.

2174. Water courses and Excavations.—Every miner who makes an excavation to a depth of 4 feet and over and leaves it for eight consecutive days, shall fence the same.

Penalties

2191. The penalty for working a mine on public or private lands without obtaining permission, or for working any mine without a license, is a fine of $200 and costs and, in default of payment, imprisonment for not more than 3 months.

2192. Every person who commences mining without informing the inspector shall be liable to a fine not exceeding $25.

2193. Every person who contravenes article 2212 shall be liable to a fine of $20 for each offence.

2194. The penalty for obstructing a party wall is a fine not exceeding $5 and costs.

2195. Any person who removes a party wall and does not provide another mode of access shall be liable to a fine of $20.

2196. The penalty for contravention of article 2173 is a fine not exceeding $5.00 and costs.

2197. Any person not complying with the decision of an inspector respecting water and watercourses shall be liable to a fine not exceeding $50 and costs.

2198. The penalty for removing any stake placed in accordance with this Act is a fine of $200 and costs, and in default of such, imprisonment for not more than 6 months.

2199. The penalty for operating a mill without a license is $100 and costs.

2200. Any mill owner contravening article 2169 shall be liable to a fine of $20. For contravention of article 2170 there is a fine of $20 for each day's delay.

2201. The penalty for not fencing a pit (article 2174) is a fine not exceeding $50 and costs.

2202. Every licensee who refuses to exhibit his license to the inspector, constable or deputy inspector, shall be liable to a fine of $5 and costs.

2203. The penalty for refusing inspectors and other officials admission to any mining land is a fine not exceeding $5 and costs.

2204. Every inspector who takes a share in any mine is liable to dismissal, cancellation of interest, and a fine not exceeding $400 and costs.

Protection of Workmen

2212. No woman or girl shall be employed in the working of a mine.

No male child under 15 years shall be employed underground or in a quarry.

No male child between 15 and 17 years shall be employed underground for more than 48 hours in any one week.

No male child under 20 years shall be employed around working machinery in or near a mine, with the exception of machinery driven by horses or other animals, in which case their driver may be 16 years of age.

2213. Every proprietor of a mine in operation, who, by himself or his agents, offends against article 2212 shall be liable to a fine not exceeding $20 and costs.

2213 a. The operator of a quarry shalls end to the Minister, notice of all accidents that occur in the working of the quarry, and such notice shall specify the nature of the accident, the number of the persons killed or injured and the names of the same.

Every person not complying with the requirements of this article, shall be liable to the penalties provided in Article 2207.

2214. Regulations may be made by the Lieutenant-Governor in Council, respecting the sanitary condition and safety of the mine and works.

2215. The inspector shall make quarterly reports to the Minister.

2216. Liquor shall not be sold within a radius of seven miles from a mine in operation unless a license to that effect has been obtained from the inspector.

Miscellaneous Provisions

2234. I. Application of Dues, Fees, and Fines.—Dues, fees and fines shall form part of the consolidated revenue fund of the Province.

2236. Fines shall be applied as follows:

(1) If the fine and costs are recovered in full, one half of the penalty, after the costs are paid, shall belong to the complainant and the balance shall be paid to the Provincial Treasurer.

(2) If the fine and costs are not recovered in full, the balance, after the costs are paid, shall be distributed as indicated in paragraph 1.

2238. II. Geological Explorations.—The Minister may cause geological explorations to be made from time to time.

2239. The Minister may also cause new mining concessions to be surveyed.

2240. III. Sale of lands, and reserves of mining lands.—Lands sold by the Crown for the working of mines in general shall be sold in conformity with this section.

2241. The Minister may reserve and withhold from sale, lands for colonization purposes.

2242. IV. Valuation of Taxable Mining Lands.—In valuing taxable property in a municipality where there are lands containing mines, such real estate shall be valued without regard to the increased value caused by the existence of the mines, provided that no mining property shall be subject to taxation during the first five years from the commencement of working.

2243. V. Regulations by the Lieutenant-Governor in Council.—The Lieutenant-Governor in Council may make regulations with respect to the following:

(1) Increasing or diminishing the size or altering the shape of lands for which mining licenses are granted.

(2) Reserving or withdrawing from sale, lands rich in minerals.

(3) Classifying, in the one or the two categories mentioned in paragraph 14, article 2098, such ores and minerals as are not therein specially named.

(4) The opening, construction and maintenance of shafts, or sluices, through any lands under mining license to facilitate the carriage and passage of water for mining purposes.

(5) Mining divisions, size, etc.

(6) Maintenance of roads, etc.

2243(a) For five years from June 1st, 1910, the Lieutenant-Governor in Council may, for that part of the gulf of St. Lawrence from the river Goynish towards the east, fix the price of Mining Concessions containing ferriferous sand, provided such price be not less than $4 per acre.

THE CONSERVATION OF MINERAL RESOURCES

By W. J. Dick

Water-powers and the products of the soil and forest may be wasted and partially destroyed, but, by careful and long continued treatment, a re-creation is made possible; by the extension of our forests and the judicious care of our soils and waters we may be assured of timber, water and abundant crops for all time.

The ores or minerals, on the other hand, are the products resulting from the action of different forces in nature extending over long periods of time which cannot be measured in terms of life. Hence, when such deposits are exhausted they cannot be replenished. The coal, when once burned, goes into the air and cannot be reclaimed. It is true that the metals saved are utilized without being, like coal, entirely and irrevocably destroyed in use. Gold and silver serve mainly to increase the stock of the precious metals upon which the monetary systems of the world are based. They are, to a certain extent, dissipated and lost beyond recovery by the abrasion of coins and use in the arts.

The use of iron, copper, lead and tin may also be divided into two classes, one of which leaves more or less scrap metal or waste from which metal can be recovered, while the other destroys or dissipates beyond recovery the metal employed. The dissipation of copper through the wearing out of bearings on railroads alone has been estimated at not less than five per cent. of the annual production of copper. The exhaustion of mineral resources, therefore, when once accomplished is a permanent exhaustion, and the conservation of these resources is a national duty.

It has been said that, owing to our sparse population and the development of our resources being in the initial stage, what Canada needs is development and exploitation, not conservation. The principles of conservation, however, do not stand in the way of development, but make possible the best and most highly economic development and exploitation in the interest of the people for all time.

In considering the conservation of mineral resources it is of the utmost importance to observe the following facts:

1. There will be no mineral industry without profits; that is to say, no mining company will mine or extract these resources in such a manner as to entail continuous loss to itself in order to conserve such resources for the future.

2. The present generation has the power and the right to use *efficiently* so much of these resources as it needs. The past has proven that the needs increase with the extension of our industries, and more rapidly than the population.

3. The nation's needs will not be curtailed. The people will take what they require.

Conservation of our mineral resources may be accomplished by investigation, education and legislation. Investigation should be carried on to determine the nature and extent of each of our important resources; the rate at which each resource is being utilized; the nature and extent of the waste in mining, extraction and use of each mineral product; how this waste can be prevented; to discover and develop substitutes which may take the place of products of importance, the supply of which is limited; to discover methods for utilizing by-products or other materials for which, under existing conditions, there is no commercial demand and which are therefore wasted. If, from time to time, the policy and action of individuals and corporations are such that wasteful methods are used in order to make large financial profits, regardless of the rights of the future, such action should be restrained by legislation.

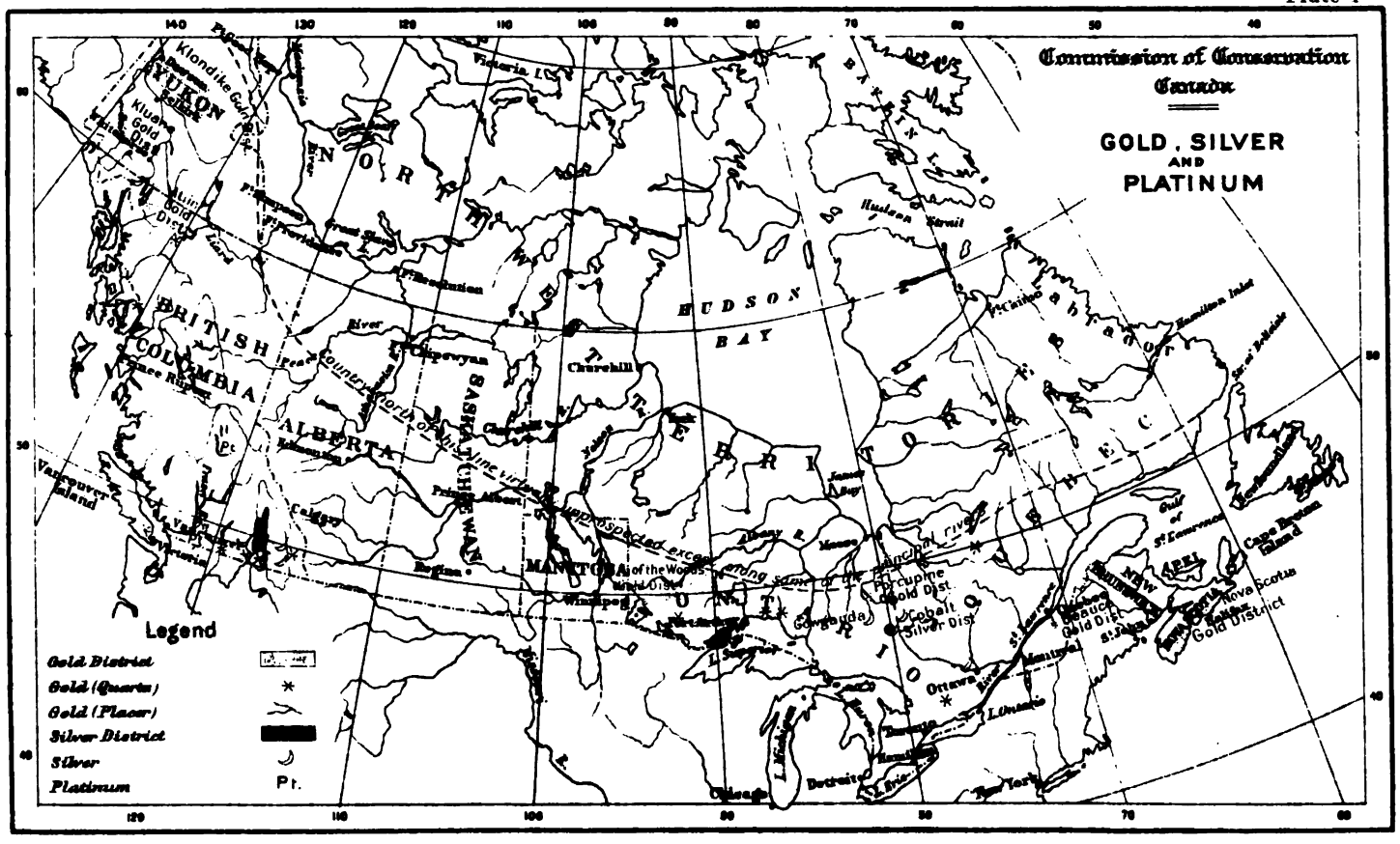
In this report statistics have been compiled relative to the known mineral resources of Canada and the annual production of minerals in each province or territory, while other information is also given relating to waste in mining and in milling and reduction. The length of the treatment of the various mineral resources is not intended to be in proportion to the value derived from them. The space allotted to each is gauged more particularly by the opportunities afforded for conservation in regard to it.

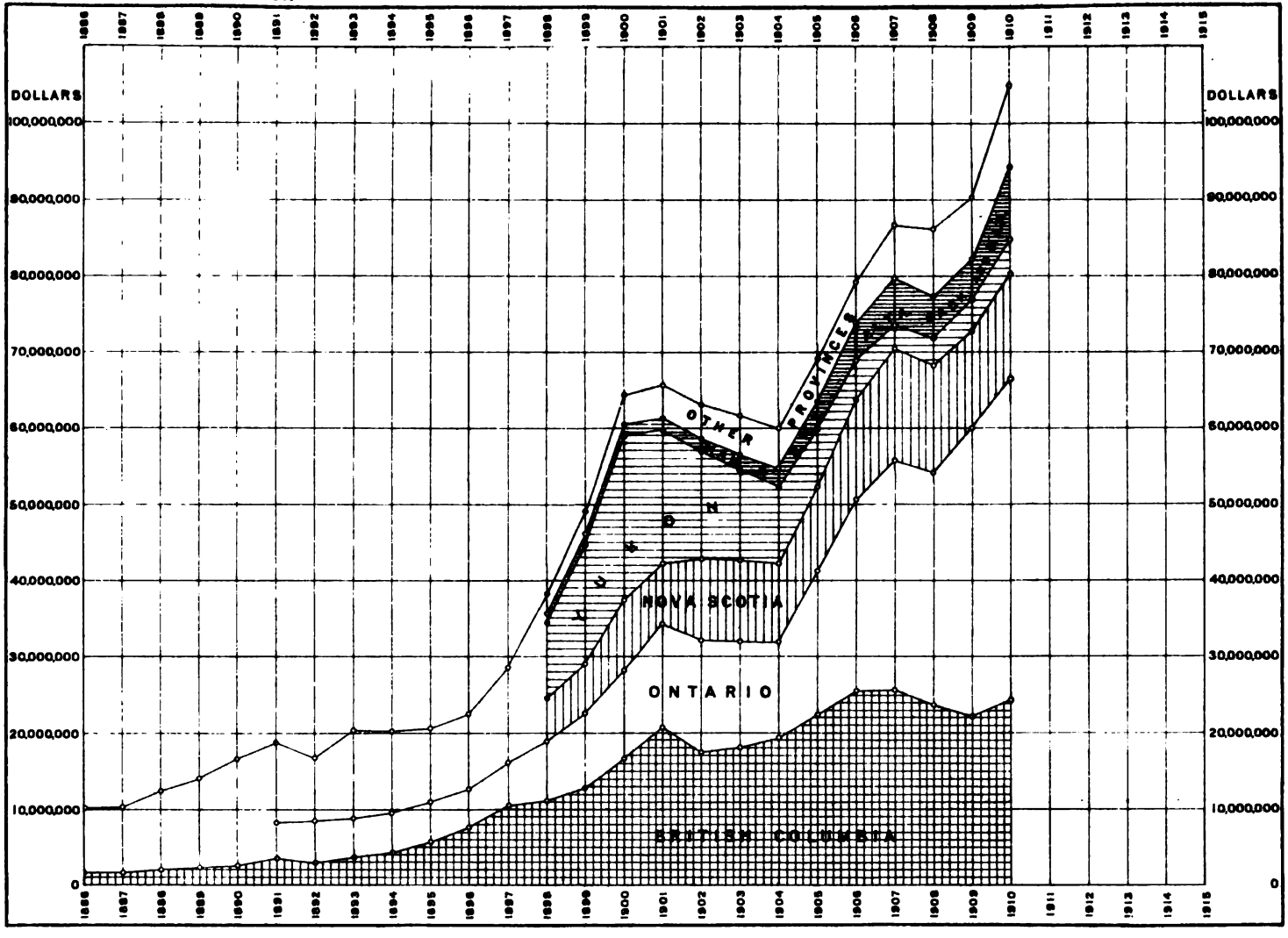
Mineral Lands of Canada

It will be noted from the mineral map (Plate I) that the greater portion of Canada is as yet unprospected (about one-third lies within the prospected area and two-thirds without), and that the mineral resources have been developed (leaving out the Yukon) practically only in territory lying fairly near the southern boundary. Even the portions of the country represented as being within the prospected territory must not be considered more than partially explored for minerals, as new discoveries are continuously being made within the supposed prospected areas. This has been the case at Cobalt, with the iron-ore deposits of the Mattagami, and with the coal at Yellowhead pass. It will, therefore, readily be seen that the unprospected area is very great, and, considering that much of the northern area has the same promising geological formation as some of our known developed deposits, it is reasonable to suppose that our mineral product will be greatly increased on its development.

Mining, although only in its infancy, has become one of the leading industries of the country, being second only to agriculture. Canada also ranks well among the mineral producing countries, being, in 1908, first in asbestos, first in nickel, third in chromite, third in silver, seventh in copper, eighth in gold and tenth in coal. The growth of the mining industry

Plate I


Commission of Conservation
Canada
GOLD, SILVER
AND
PLATINUM
Legend
Gold District
Gold (Quartz)
Gold (Placer)
Silver District
Silver
Platinum
Pt.
YUKON
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
NORTH WEST TERRITORIES
HUDSON BAY
Hudson Strait
Churchill
Chipewyan
Prince Albert
Regina
Winnipeg
Calgary
Vancouver Island
Victoria I.
Kluane Gold Dist.
Klondike Gold Dist.
Cobalt Silver Dist.
Porcupine Gold Dist.
Ottawa
Montreal
Detroit
Chicago
Gulf of St. Lawrence
Cape Breton Island
Nova Scotia Gold District
Gold District
Hamilton Inlet
Strait of Belleisle
Country north of this line virtually unprospected except along some of the principal rivers



MINERAL PRODUCTION OF CANADA AND OF THE PRINCIPAL PROVINCES FROM 1886 TO 1910

in Canada since 1886, is best shown in Plate II. The upper line of the diagram represents the mineral production of Canada, which has increased from $10,000,000 in 1886 to over $105,000,000 in 1910[a]. The shaded areas represent the production of the various provinces.

Gold

PRODUCTION OF CANADA.—From 1896 to 1900 the gold production of Canada increased at a very rapid rate, owing to the discovery of the rich gold placers of the Klondike. From 1900 to 1907 the gold production fell off from over $27,000,000 to $8,000,000, owing to the smaller production of gold in Yukon. Placer gold mining, while probably the most fascinating form of mining, since a prospector can attempt it without the aid of capital, is subject to the greatest fluctuations, even after it passes out of the range of individual methods into the hands of large companies. At present, the gold production of Yukon is increasing, and it is reasonable to suppose that it will continue to increase, owing to the extensive operations that are being made for dredging and hydraulic mining. The production of gold in British Columbia shows a slight increase over 1909; a decrease in Cariboo due to a shortage of water was offset by increased production in Similkameen and Atlin districts and in Yukon. The gold production of Canada is shown in the accompanying diagram. (See Plate III.)

PRODUCTION OF THE WORLD.—The rapid increase in the world's production of gold may best be seen in the diagram. (See Plate IV.) In 1886, the production was about $100,000,000. From that period to the present time, with the exception of the temporary decline due to the Boer war in 1899-1902, there has been an enormous annual increase, and in 1910 the production was about $469,000,000. The increase is due to the numerous discoveries in South Africa, Western Australia and Colorado in the period 1885 to 1890; the introduction of the cyanide process, and the discoveries made in Alaska, Nevada, Yukon, Mexico, Rhodesia and West Africa.

Africa produced about $172,000,000 in 1910, or about thirty-seven per cent. of the world's production. Of the African output, $155,000,000 comes from the Transvaal alone.

RESOURCES OF CANADA.—The diagram (Plate III) shows that the gold production of Canada can, for present purposes, be divided into three parts. In 1910, British Columbia and Yukon, in the order named, contributed $5,432,000 and $4,550,000 to the total output. The remaining third part, approximately $400,000, came from Nova Scotia, Ontario and Quebec, the amount from the remaining provinces being negligible. The western or Cordilleran belt, extending from South America to Alaska, is recognized as one of the greatest mining regions of the world—noted principally for its wealth in gold, silver, copper and lead.

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[a] NOTE—Statistics for 1910 are subject to revision.

Mexico, having 1,750 miles of this belt, has had a production of $5,500,000,000 worth of precious metals, or about $3,000,000 per mile in length; and the United States, with 1,100 miles of this range, has had about the same relative production. In Canada this belt has a length of 1,300 miles and a width of 400 miles, and only the southern fringe has been developed. Although developed along the international boundary, and while some of the main streams have been prospected for placer gold, the greater part of the belt is untouched. Probably not one-fifth may be said to have been prospected at all; not one-twentieth prospected in detail, and not one area completely tested.

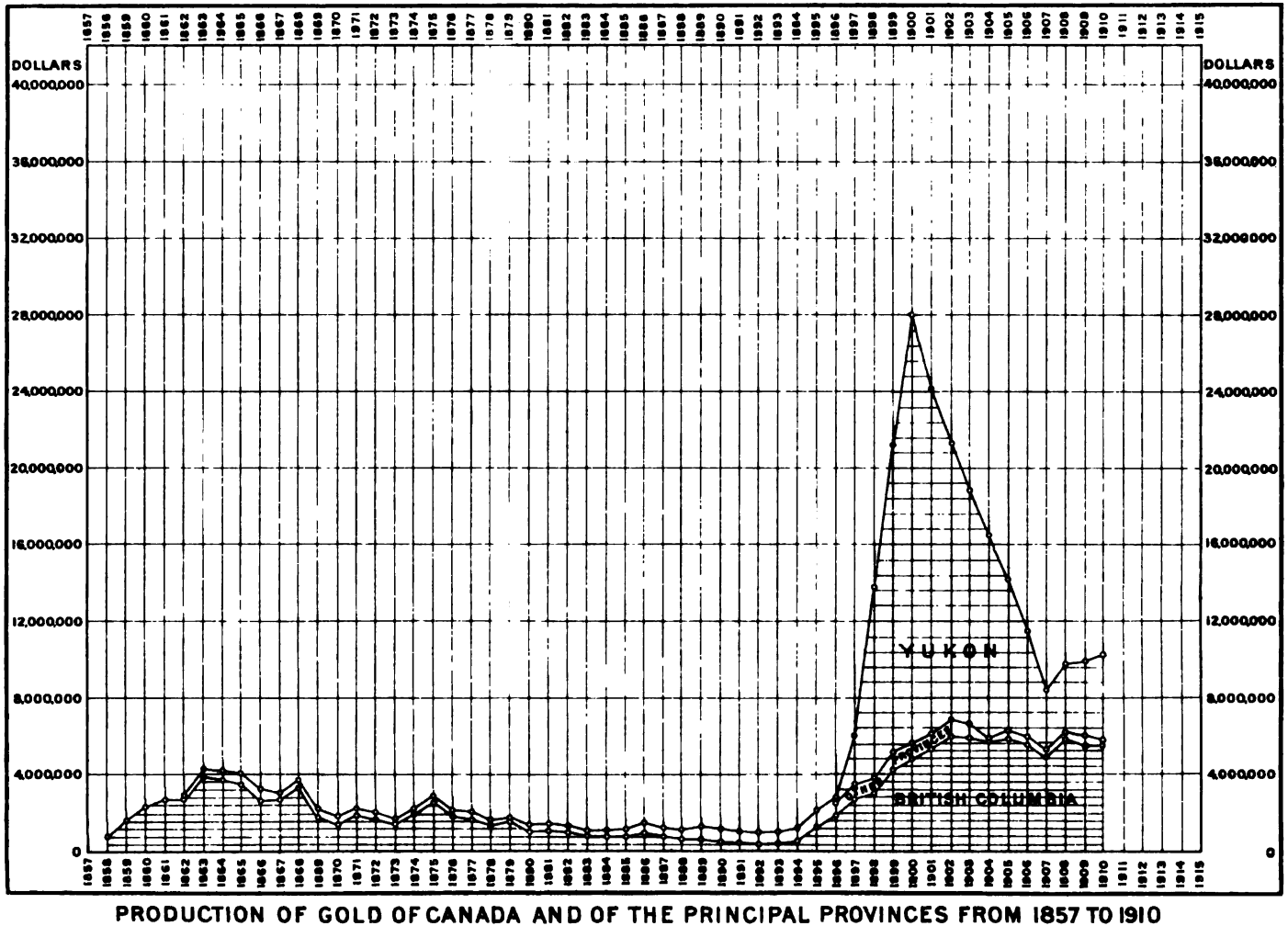
YUKON TERRITORY.—Since the discovery of the rich placers in 1897, Yukon has produced over $136,500,000 worth of gold. The production increased from $300,000 in 1896 to $22,275,000 in 1900; from that date to 1907, the production decreased to $3,150,000, owing to the exhaustion of the richer gravels. The production in 1910 was $4,550,000, showing an increase over 1909 of about fifteen per cent. The future production will increase annually, owing to the mining being put on a more stable basis, due to the reduction of costs and the advent of large companies. Large companies are carrying on extensive operations for dredging and hydraulic mining for the purpose of working over the old tailings and the large deposits of low-grade gravel.

BRITISH COLUMBIA.—The gold production of British Columbia is increasing, being $713,738 in 1885, and $5,432,000 in 1910. The present production is made up of gold recovered from placer workings (8·8 per cent.) and gold recovered from lode mining (91.2 per cent.). The placer gold mining is subject to fluctuations, while the gold recovered from lode mining is more constant, and increased 13.3 per cent. in 1910. The production of lode gold in 1910 was $4,950,000, 86.5 per cent. of the lode gold of the province being recovered from copper-bearing ores. The remaining 13.5 per cent. was recovered by stamp milling.

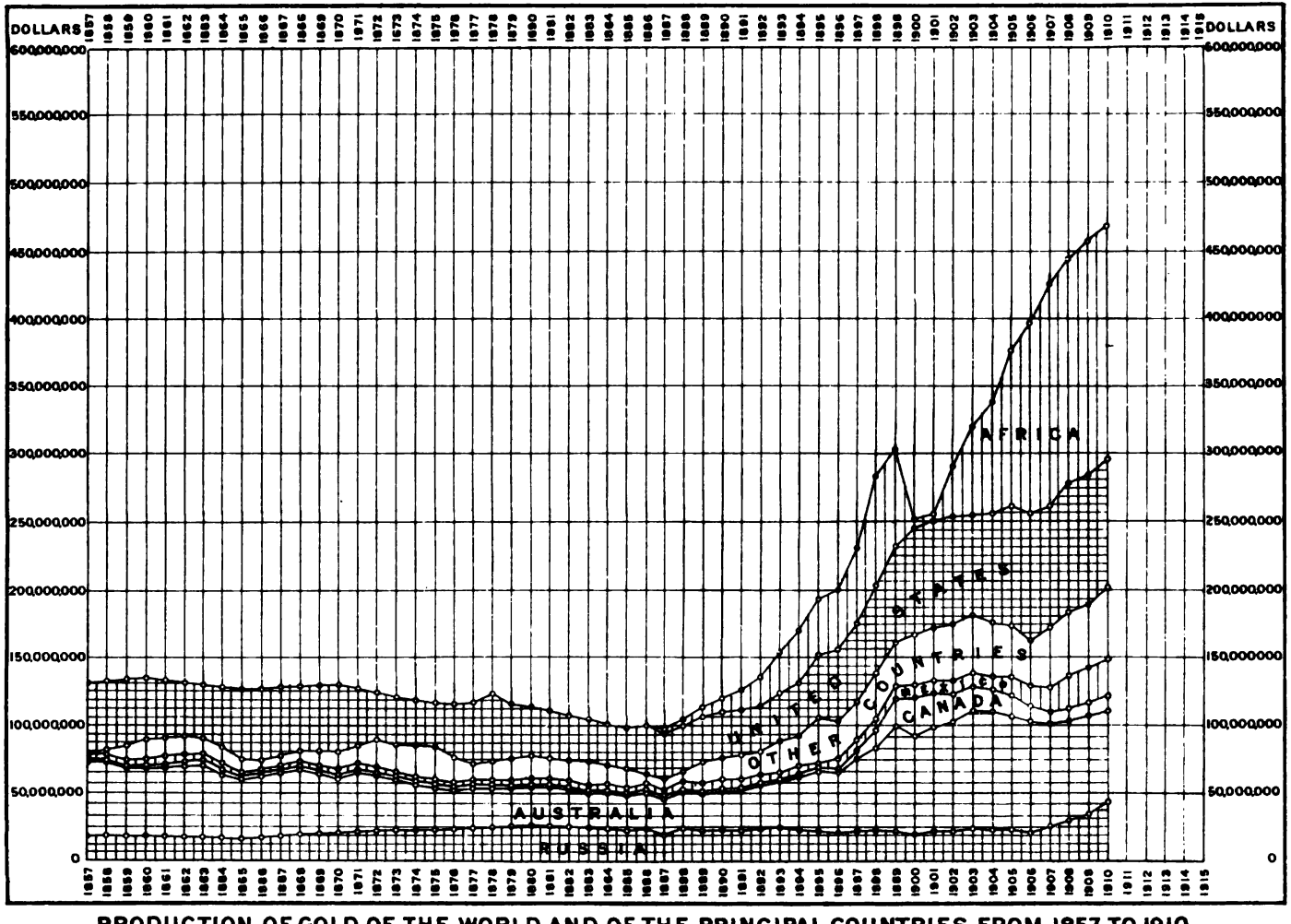
From these facts it can be seen that the gold production of British Columbia is dependent, to a great extent, upon the copper output. The present outlook is that the gold production of British Columbia will increase, as there is a revival of hydraulic mining in the Cariboo district; and as the country generally is being more fully developed.

ONTARIO.—Gold in considerable quantity has been discovered over an extensive area in the Porcupine district, and it is expected that, upon the development of this district, Ontario will become a large producer.

CONCLUSIONS.—In the preceding paragraphs it has been shown that the gold production of Canada comes largely from the Yukon territory and British Columbia; that there is an enormous unprospected area in Canada, and that, even without any new discoveries, the present gold output will increase, or at least be maintained.



PRODUCTION OF GOLD OF CANADA AND OF THE PRINCIPAL PROVINCES FROM 1857 TO 1910



PRODUCTION OF GOLD OF THE WORLD AND OF THE PRINCIPAL COUNTRIES FROM 1857 TO 1910

The known resources cannot be estimated with any degree of exactness. Only in the case of placers is a rough estimate possible. The known resources of placer gold in the Klondike alone have been estimated at $100,000,000.

WASTE.—There is comparatively little avoidable waste in the mining of gold ores. The operators and smelters recover as much of the gold as is economically possible. Every mining engineer engaged in gold mining is continually striving to improve his process.

In placer mining the loss of precious metal, while considerable, is unavoidable. The best available methods are generally employed. The tailings, however, are generally dumped into the streams or rivers and often cover up much low-grade gravel. This practice should be prohibited by legislation.

Silver

PRODUCTION OF CANADA.—The silver production of Canada became of importance on the discovery, in 1904, of the rich silver deposits of Cobalt, Ontario, and increased rapidly, the production being nearly 28,000,000 ounces in 1909, and 32,000,000 ounces in 1910. The growth of the industry in Canada since 1886, is best shown in the diagram. (See Plate V.)

PRODUCTION OF THE WORLD.—The world's production of silver was 92,000,000 ounces in 1885 and about 217,700,000 ounces in 1910. The United States and Mexico each produce about one-third of the production of the world, while the remainder is mainly derived from Canada, New South Wales, Germany, Peru and Bolivia. In 1910 Canada, with 32,000,000 ounces, ranked third as a producer of silver. The remarkable feature of the silver mining industry is that, within the course of the last twenty-five years, the value of silver has declined in value from $1.30 to about 54c. per ounce, but, as it is now produced largely as a by-product from ores worked primarily for other metals, the present production will probably continue.

SILVER RESOURCES OF CANADA.—The diagram (Plate V) shows that British Columbia and Ontario are practically the only silver producers in Canada. British Columbia has been a fairly constant producer, averaging a little over 3,000,000 ounces per year since 1896. Dating from the discovery of the remarkable silver deposits of Cobalt in 1904, the production of Canada has risen from about 6,000,000 in 1905 to 32,000,000 ounces in 1910. Over ninety per cent. of the present silver output of Canada is derived from the cobalt-silver ores of Cobalt, Ontario. The map (Plate I) shows the principal silver deposits of Canada.

BRITISH COLUMBIA.—In British Columbia the silver is recovered with the lead from the galena ores of East and West Kootenay, and from the matte from the gold-copper-silver ores of the Boundary and Coast districts; about ninety-two per cent. is obtained from ores

in which the silver is found associated with lead, the remainder being found chiefly in conjunction with copper-silver ores. From this it is evident that the present silver production of British Columbia is assured so long as the mining of lead and copper ores continues on the present scale.

ONTARIO.—Since the discovery of the deposits at Cobalt, Ontario has produced over 92,000,000 ounces of silver, valued at about $47,500,000, the production in 1910 alone being about 29,000,000 ounces. The world's production in 1910 is placed at about 217,700,000 ounces, so that Ontario contributed over 13.3 per cent. of this amount.

WASTE.—There is very little waste in the mining of silver ores. In concentrating, the losses are greater than in mining; but it is not to be supposed that such losses could be avoided. All the mineral which can be extracted at a profit is recovered.

Since the introduction of the cyanide process, many low-grade dumps and tailings have been worked over, and the valuable mineral extracted at a profit. Past experience in mining has proven that, while it is necessary to extract the mineral at a profit, no mineral, even of the smallest value, should be entirely wasted. In this connection it is advised that the tailings from all lead and silver mills should be impounded. The impounding could usually be done at a very small cost to the operator; in fact, many mining engineers at present find that it is to their advantage to store their tailings.

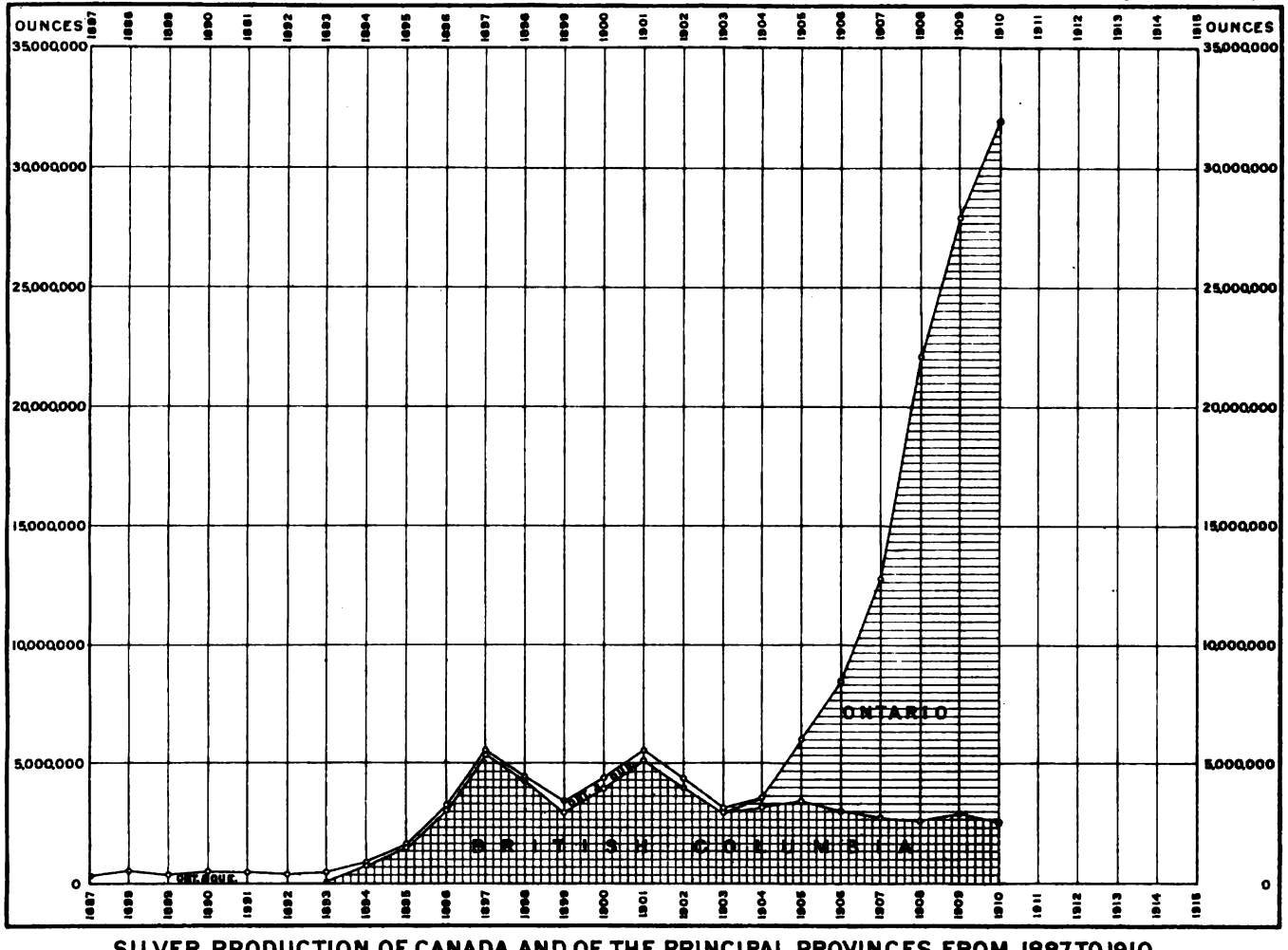
Copper

PRODUCTION OF CANADA.—The copper mining industry of Canada has developed at a very rapid rate. In 1886 the production was 3,505,000 pounds, and six years later, in 1892, it had doubled. Eighteen years later, in 1910, it had increased over sixteen-fold, amounting to over 56,600,000 pounds.

PRODUCTION OF THE WORLD.—The world's production of copper has grown rapidly, owing, principally, to the increased production of the United States. In 1910, the United States produced nearly fifty-seven per cent. of the total output. In the same year Canada ranked seventh, producing about three per cent. The relative importance of the copper industry in the different countries may be seen from the diagram (Plate VIII).

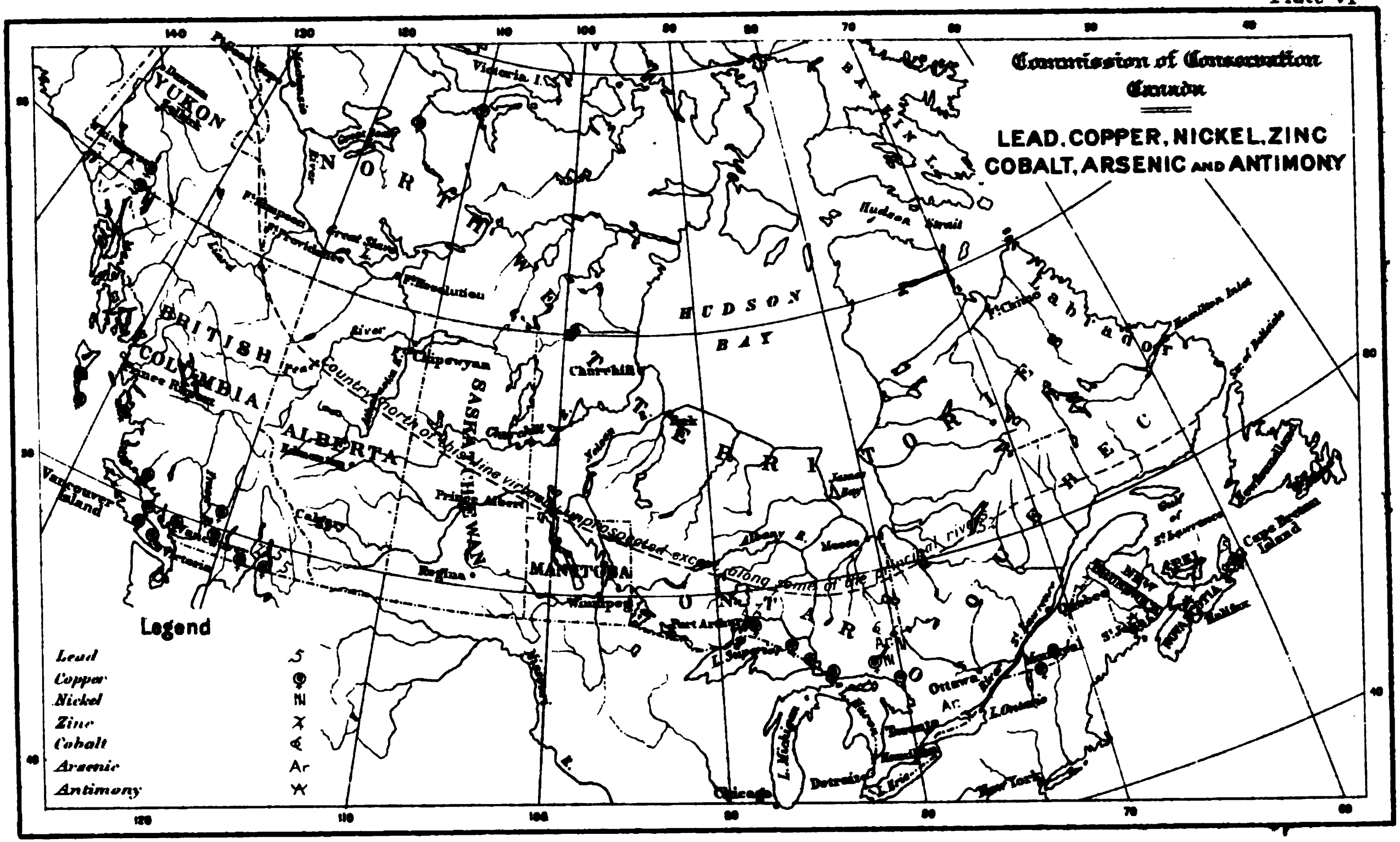
The supply from Spain is almost constant at 50,000 long tons per annum; that of Germany likewise with 20,000 tons; Australia, South America, Canada, Mexico and Japan have shown rapid growth in the copper industry. Among these, South America, owing to the increased productions of Peru and Chili in 1908, leads with an output of 55,000 long tons.

RESOURCES OF CANADA.—From 1886 to 1894, the bulk of the copper production was derived from the ores of Quebec and Ontario, Quebec averaging about 3,000,000 pounds of copper per annum.



SILVER PRODUCTION OF CANADA AND OF THE PRINCIPAL PROVINCES FROM 1887 TO 1910

Plate VI


Commission of Conservation
Canada
LEAD, COPPER, NICKEL, ZINC
COBALT, ARSENIC AND ANTIMONY
Legend
Lead
Copper
Nickel
Zinc
Cobalt
Arsenic
Antimony
HUDSON BAY
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
YUKON
NORTH WEST TERRITORIES
Country north of this line virtually unprospected except along some of the principal rivers
Hudson Strait
Victoria I.
Churchill
Prince Albert
Regina
Winnipeg
Port Arthur
L. Superior
L. Michigan
L. Huron
L. Ontario
L. Erie
Ottawa
Toronto
Chicago
Detroit
New York
Gulf of St. Lawrence
Cape Breton Island
Halifax
Vancouver Island
Calgary
Edmonton

Upon the development of the copper ores of the Boundary and Rossland districts in 1900, British Columbia became the principal producer of copper. The diagram (Plate VII) shows the production of copper of the principal provinces since 1886. In 1910, British Columbia produced over sixty-three per cent. of the total output of Canada; of the remaining thirty-seven per cent., Ontario produced by far the largest share.

The map (Plate VI) shows the principal copper and lead deposits of Canada.

British Columbia.—British Columbia contains at least three copper districts of importance: the Rossland, Boundary and Coast districts. The Rossland district became of importance in 1896, producing over 1,500,000 pounds. The production increased to a maximum in 1902, amounting to 11,667,807 pounds in that year. In 1910, the output had fallen off to 2,600,000 pounds. The production in the Boundary district was 5,672,177 pounds in 1900, and increased to 40,181,790 pounds in 1909. In 1910, the output had fallen off to 29,400,000 pounds. The Coast and Cassiar districts produced 3,230,000 pounds in 1910.

Ontario.—The copper production of Ontario is derived mainly from the nickel-copper ores of the Sudbury district. There are many copper deposits, however, some of which have been worked extensively in former years, such as the old Bruce mines on the north shore of lake Huron. The copper production of Ontario has increased at a very rapid rate, increasing from 165,000 pounds in 1886 to over 19,000,000 pounds in 1910. As the nickel-copper resources are large, and, as the mining of this ore is independent of the price of copper, it is reasonable to suppose that the present output will increase or, at least, be maintained for a number of years.

Conclusions.—Copper deposits differ so completely in their occurrence from coal beds that known reserves, like those of coal, cannot be expected. The present reserves of copper ore in Canada are greater than that of any other metallic mineral, excepting iron, and while probably few of the mines have reserves sufficient for ten years' work, each year's development will add new reserves, and upon more thorough prospecting, new deposits will possibly be found.

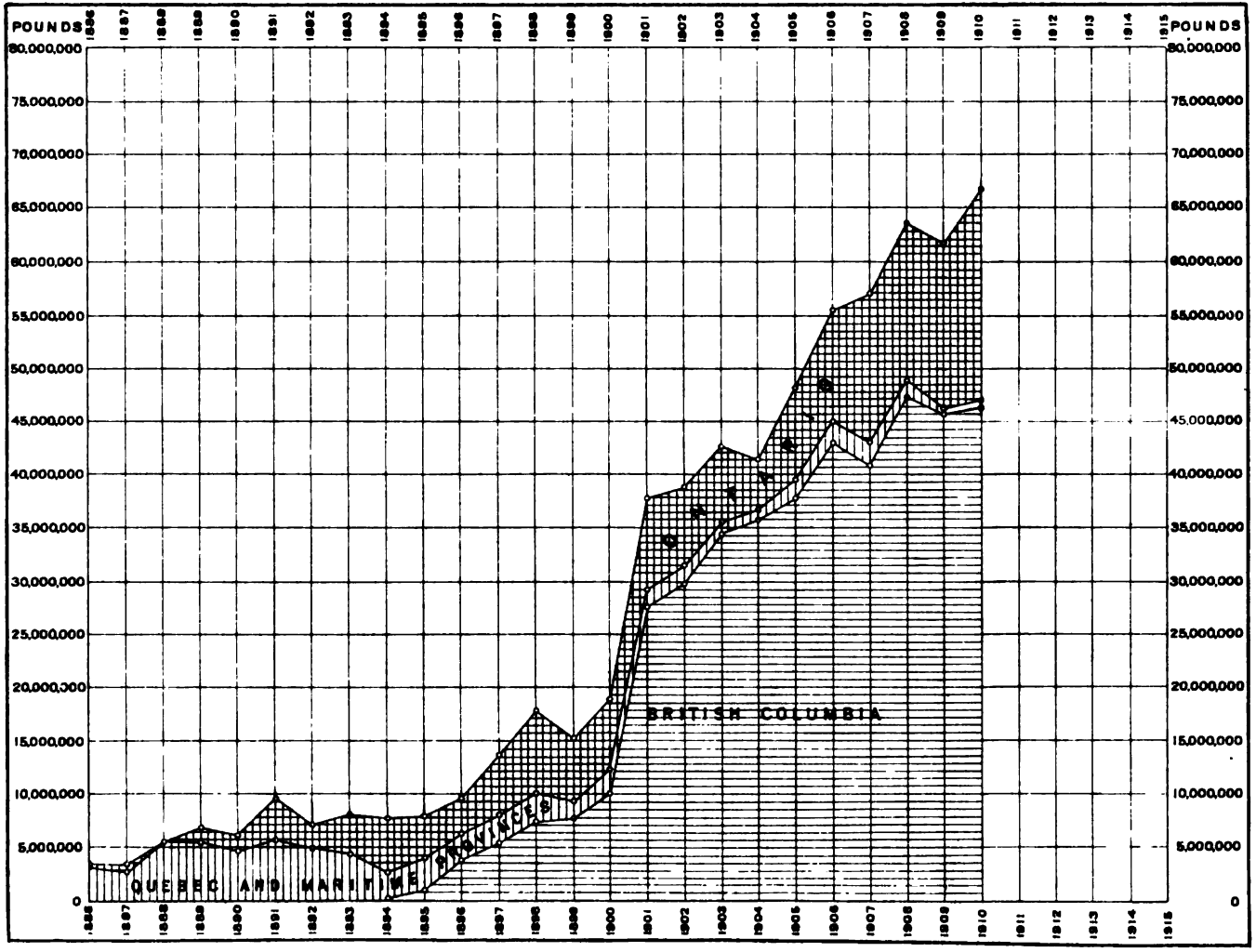
Consumption.—Only a part of the copper produced is consumed in Canada. Nearly all of our production of matte and blister is exported for refining. In 1910, Canada exported 56,964,000 pounds (practically the whole of the production) of copper contained in ore, matte and blister, and imported in the same year 30,237,106 pounds. Of the imports, over 25,300,000 pounds, valued at $3,729,592, were in the form of manufactured articles, such as copper bars, rods, plates, strips and wire.

Waste.—It is not believed that the waste in the mining of copper ores is excessive. Ores too poor to extract at prevailing prices are, of course, left in the mine, but treatment is now so cheap that very low

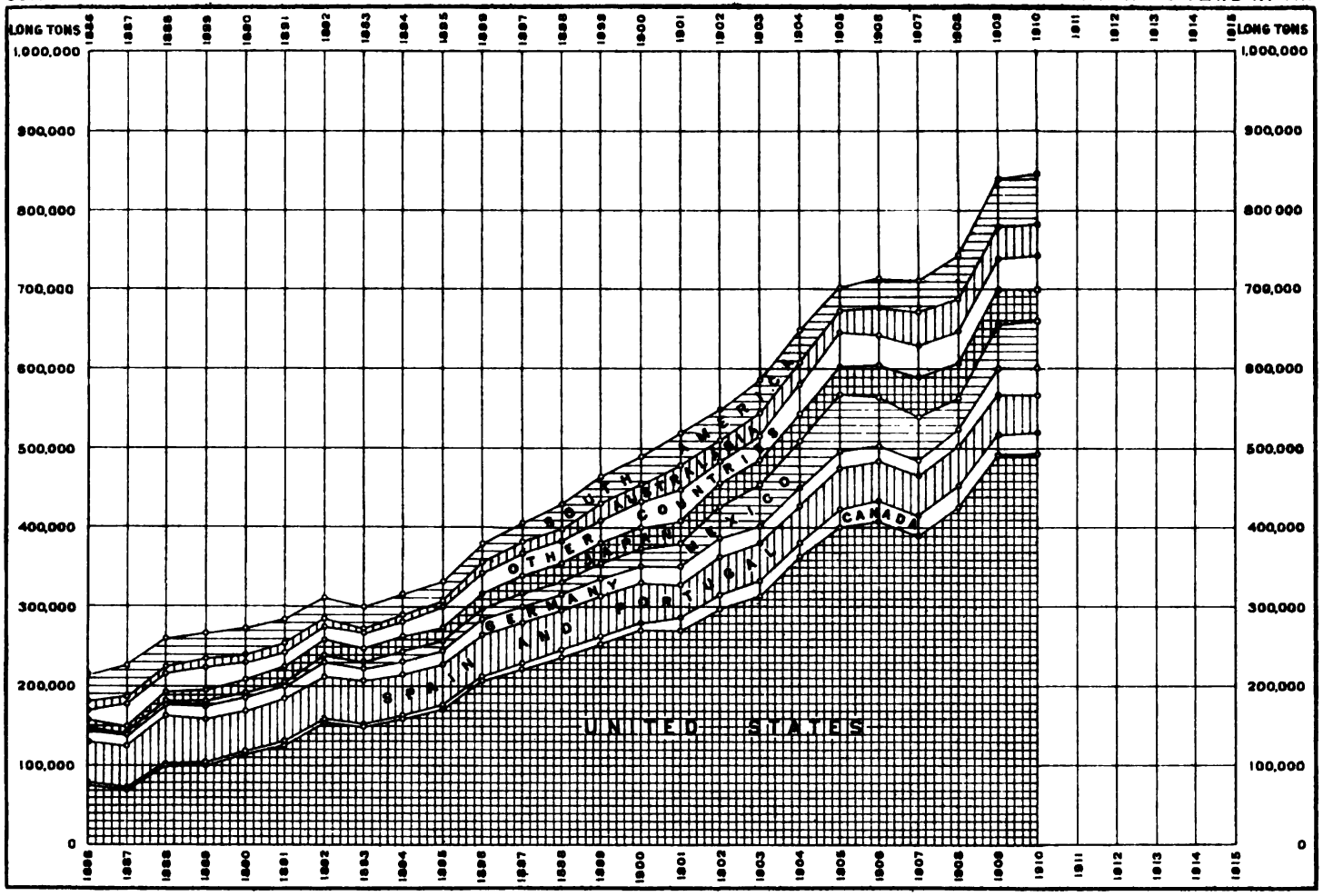
grade ores are handled profitably. In some cases, pillars of ore are left, but these are generally chosen so as to include only low-grade ore, and the shape of the deposit is generally such that all ore can be extracted without much loss. In industries like copper mining, where the "ore" has rapidly changed its meaning within the last decade,—where, in other words, ore containing one, two or three per cent. of copper can now be mined profitably where it was formerly considered waste—it is clear that large bodies must be left now which, later, may possibly be extracted with profit. This also applies to ores mined under unfavourable conditions. On the betterment of conditions, ore left in the mine as too low-grade to extract, may eventually be recovered, provided the mine does not go to wreck in the meantime, and provided that sufficient records of the old workings have been kept. The Dominion and Provincial Governments could do much to ensure the keeping of records by making it compulsory for the owner of each mine, at the time of its abandonment, to file an accurate plan on a suitable scale, showing the boundaries of the workings up to the time of abandonment, together with an assay plan showing the position and value of any low-grade ore left in the mine. This would not be too much to ask from the owners, as all well-managed mines possess this information. Such plan would not only throw more light on the geological features of the region, but would be of great use in re-opening an old mine and would, also, safeguard an adjoining mine from breaking through into the old workings, thereby endangering life and property by the inflow of water and the fall of ground. This rule is embodied in some coal and metal mine regulations and should be extended to cover all metal mines.

In the smelting of copper ores, the loss is, to a great extent, represented by the small quantities of gold, silver and copper left in the slag. The slag should be stored on the dump and not granulated and allowed to pass into the rivers. The practice of dumping tailings and slag into the rivers represents a two-fold evil—the loss of valuable mineral and the pollution of streams. The following is taken from a paper given by Dr. James Douglas[a]: "Certain lessons, however, the above recital of experience teaches. One of them is, never to throw away anything that contains mineral of any value, even though it may seem to be valueless. The time inevitably and invariably comes when, through improved conditions or better methods, what was waste to one generation becomes of value to another. Most of the filling of the old stopes in the Copper Queen mine and in the old Dominion mine has already been re-treated. In the case, therefore, of sulphide ore, which is too lean to handle, it should be stored underground rather than exposed to the weather at the surface. I am not sure whether we are justified in ballasting our railroads with the slags which we are making now—lean as they are. One cannot see

[a] Transactions, A. I. M. E., Vol. L.



COPPER PRODUCTION OF CANADA AND OF THE PRINCIPAL PROVINCES FROM 1886 TO 1910



COPPER PRODUCTION OF THE WORLD AND OF THE PRINCIPAL COUNTRIES FROM 1886 TO 1910

how 0·5 per cent. of copper and a little gold and silver can possibly be recovered to any advantage, and yet the future may reveal secrets which will convert such impossibilities into possibilities. The slags from the iron blast furnaces, which were deemed valueless a generation ago, are made into hydraulic cement to-day."

In concentrating copper ores the losses are greater than in mining. The principal valuable mineral in the concentrating ores is chalcocite, which is easily slimed; the loss may be thirty per cent. of the metal contained, and it is not always easy to avoid it. While there are, practically, no copper concentrators in Canada at present, the storage of tailings should be enforced in order to prevent this waste and to conserve the tailings for future use in concentrators that may be erected.

Lead

PRODUCTION OF CANADA.—The production of lead in Canada is obtained almost entirely from the province of British Columbia. The diagram (Plate IX) shows graphically the annual production from 1887 to 1910. From 88,665 pounds in 1891, the production increased to 39,018,219 pounds in 1897, an average increase of about 6,500,000 pounds per year. Owing to the low price of silver in 1898, and the labour trouble in the Slocan in 1899, it fell off to 21,862,436 pounds in 1899, but rose to 63,169,821 pounds in 1900. This increase was due to the development of two or three mines in the Fort Steele Mining Division, although all the lead-producing districts, except Ainsworth, showed a material increase in production. The production fell to 18,139,283 pounds in 1903, owing to the condition of the market affecting the production of the low-grade silver-lead ores of the East Kootenay district. In order to assist the industry, an Act[a] was passed in October, 1903, providing for the payment of bounties on lead contained in lead-bearing ores mined in Canada. This Act provided for the payment of a bounty of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 lbs. such bounty should be reduced proportionately. Thus, when the price of lead rose to £16, or over, per ton of 2,240 pounds, the bounty ceased. As the price of lead exceeded £16 on the London market for a considerable period during 1906 and 1907, the bounty paid during those years was comparatively small. The Act of 1903 further provided that the bounty should cease on June 30, 1908, but as only a portion of the funds provided had been used, a new Act[b] was passed in the latter year, providing for further payments at the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s., the bounty shall be reduced by such excess.

[a] 3 Ed. VII, Chap. 31.
[b] 7-8 Ed. VII, Chap. 43.

In 1905, as a direct result of the bounty, the production reached 56,864,915 pounds, but fell off gradually to 43,195,733 pounds in 1908, and, in 1910, owing to the destruction by fire of mine buildings in the Slocan, it decreased to 32,987,000 pounds.

PRODUCTION OF THE WORLD.—In 1909, the world's production of lead was about 1,200,000 short tons. The principal producers were the United States, 33.1 per cent.; Spain, 17 per cent.; Germany, 14 per cent., the next largest producer being Mexico, with 10 per cent. Canada produced about two per cent. of the total. From 1897 to 1903, the total production of all countries increased rapidly. In 1909, Australia, Spain and England showed a decrease over 1908, while in the same year the production in the United States shows an increase of over fourteen per cent.

RESOURCES OF CANADA.—As already noted, the production of lead in Canada is derived entirely from British Columbia. In 1909, the production was 44,396,346 pounds, showing an increase in amount of 2.7 per cent. and in value, of 4.7 per cent. This increase in value was due to the average market price of that year being a little higher than in 1908. The lead production in this year was derived chiefly from the Fort Steele Mining Division, as is shown in the following table:

MINING DIVISION	PRODUCTION		PER CENT. OF TOTAL
Fort Steele	27,023,252	lbs.	60.86
Ainsworth	10,298,343	"	23.19
Slocan	4,976,199	"	11.20
Nelson	1,097,069	"	2.47
Trout Lake	976,601	"	2.23
All others	24,882	"	0.05

FORT STEELE MINING DIVISION.—The St. Eugene mine, owned and operated by the Consolidated Mining and Smelting Company of Canada, is the largest producer of lead in British Columbia. In 1908, it produced about sixty-five per cent. of the total output of the Province, producing approximately 160,000 tons of ore, yielding about 8.8 per cent. of lead and 3.6 oz. of silver to the ton. In 1909, 147,300 tons were mined and the lead produced was 59.5 per cent. of the total lead output of British Columbia. The ore is galena in a quartz gangue with a little zinc blende, and is suitable for concentration. It is concentrated at the mine, the concentrates averaging about sixty-six per cent. lead. The crude ore and concentrates are smelted and refined at Trail, B.C. In the vicinity of Moyie there are a number of very promising prospects which probably require only proper treatment to make them permanent shippers. The Sullivan mine, situated a few miles from Kimberley, although now idle, possesses large reserves

of low-grade ore; but, owing to the ore being a mixture of the sulphides of lead, zinc and iron, it is impossible to concentrate it by water, and direct smelting is necessary. The ore averages about 16.5 per cent. lead and 7 oz. of silver to the ton. The zinc contents vary from fourteen per cent. to twenty per cent.

The Sullivan Mining and Smelting Co. built a smelter at Marysville, a few miles from the mine, but, owing to the difficulty in treating the ore and the low price of silver, operations were suspended in 1908.

The only other important producing mine in this district is the North Star. This mine shipped 3,900 tons in 1909, carrying about 22 per cent. of lead and 15 oz. of silver to the ton. It is not believed that this mine will increase its tonnage to any great extent (unless new discoveries are made), as the present ore reserves are small.

Ainsworth Mining Division.—The veins in this district, while fairly rich in lead, are of low silver value. Zinc ores occur quite extensively with the galena in the veins, and, in the early days, the zinc was eliminated during concentration and sent down the creeks with the waste. Many of the mines have large reserves of ore in which the tenor of lead and zinc is fairly high. With the present price of lead and zinc, Ainsworth should be an important producer; more particularly would this be the case if modern methods of mining and concentration were used, and if the experiments now being carried on by the Dominion Government result in the successful treatment of these ores. The Bluebell mine is the most important producer, mining and concentrating nearly 59,000 tons of lead ore in 1909.

Slocan Mining Division.—The silver-lead-zinc deposits are divisible into two series—the dry ore, or siliceous veins, and the lead ores. There is another class of deposit in the Slocan series in which the limestone is replaced by zinc-blende and pyrites. In depth, both classes of veins have practically the same composition and pass into almost straight quartz veins. The known resources are large, and the remarks made concerning the Ainsworth production also apply to the Slocan.

Consumption.—The production of refined lead, including pig lead and lead pipe has been as follows:

1904	3,759 tons
1905	7,902 "
1906	10,235 "
1907	13,303 "
1908	18,274 "
1909	20,941 "

The refined lead finds a market in Canada, the United States and the Orient, about thirty-eight per cent. of the production in 1908 being exported, chiefly to China and Japan. In the manufacture of white lead,

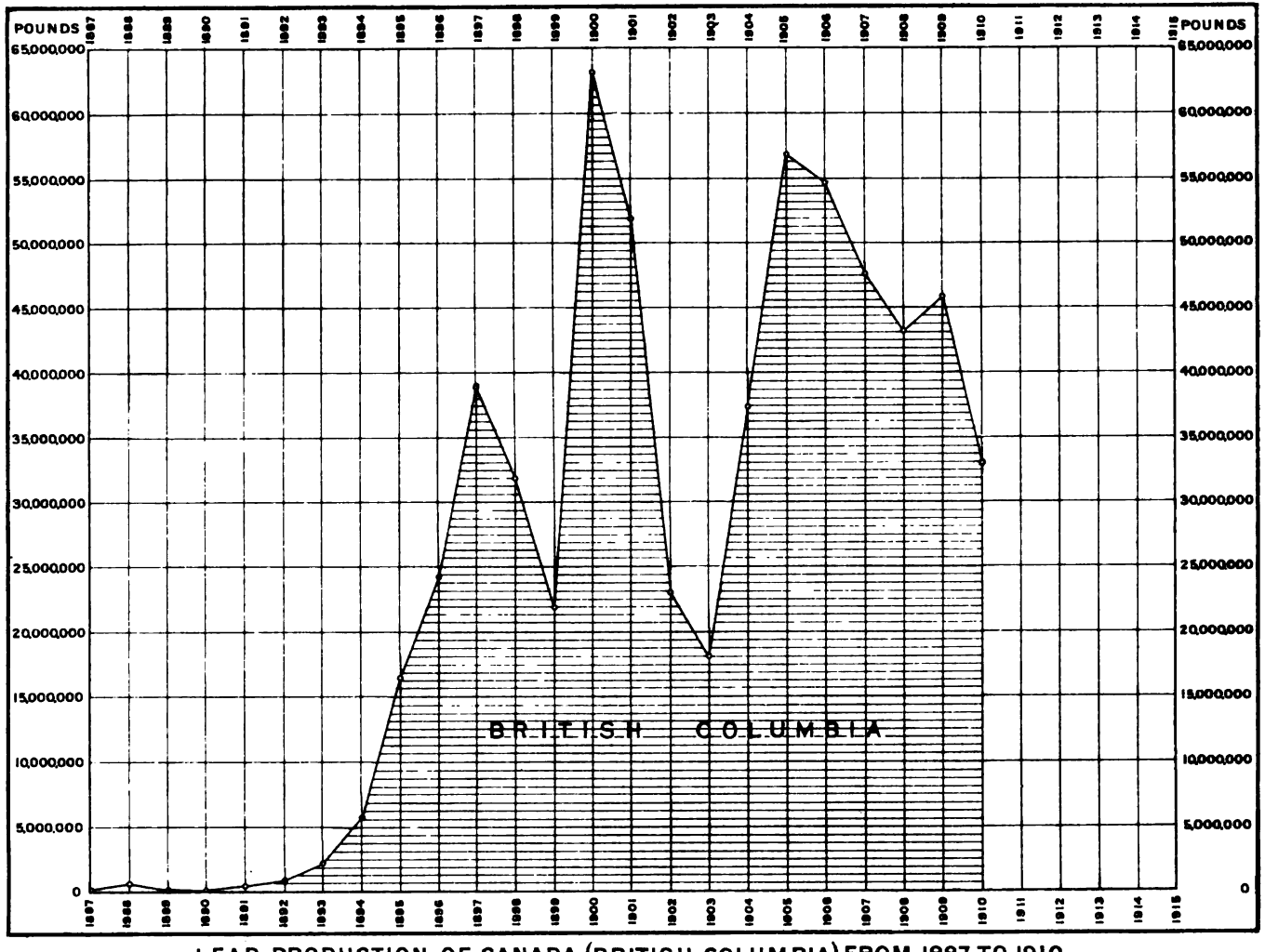
one plant with a capacity of 7,000 tons per annum, uses Trail lead exclusively. The production in 1910 was 16,493 tons, and of this, 3,879 tons were exported, leaving 12,614 tons for home consumption. The imports during the fiscal year 1910 amounted to 8,305 tons, not including certain manufactures of lead valued at $308,478, so that the total consumption of lead in that year probably exceeded 23,000 tons. One-third of the present consumption is used in the manufacture of white lead and is consumed as paint. The lead so used is absolutely lost and it does not seem as if, for these purposes, some other material might be substituted, although the manufacture of zinc-white zinc-lead oxide has increased greatly during the past few years. With the general substitution of brick, stone or cement (of which our resources are inexhaustible) for wood (of which our supply is diminishing) the demand for white lead would greatly decrease.

WASTE.—There is little waste in the mining of lead ores. Low-grade ore, or ore too difficult to treat, is usually left in the mine. This is not a permanent loss, as the lead may be eventually recovered on the betterment of conditions and the discovery of a method for successfully treating these ores, provided, of course, the mine does not go to wreck in the meantime. The loss in smelting and refining is usually about five per cent., but all slag should be stored on the dump, available for further treatment. The practice of granulating the slag with water and running it into the sea or rivers should be forbidden. Great waste occurs in concentration, often amounting to fifteen or twenty per cent. It is not easy to avoid this, and, if the tailings are stored, it will prevent a permanent loss of valuable mineral.

Zinc

Although large deposits of fairly high grade zinc ore exist in British Columbia, owing to the high tariff on zinc ore exported to the United States and the remoteness of the Province from the markets of the world, the industry is of very small importance. The production of zinc ore in Canada in 1908, was 452 tons, valued at $3,125, all having been derived from the Richardson mine in Olden township, Frontenac county, Ontario. In 1909, British Columbia produced and sold about 10,000 tons, ranging from thirty-eight to forty-eight per cent. zinc. The only mine producing zinc ore only, is the Lucky Jim, in the Slocan mining division, where about 4,700 tons of forty-eight per cent. zinc ore were produced. In the Ainsworth mining division, the Whitewater produced about 1,600 tons of thirty-eight per cent. zinc concentrates, from an ore consisting of mixed galena and zinc blende, and the Whitewater Deep produced 3,000 tons of forty-three per cent. zinc concentrates from a similar ore.

In 1905, a Commission was appointed to investigate the zinc resources of British Columbia, and its findings are embodied in a report issued by



LEAD PRODUCTION OF CANADA (BRITISH COLUMBIA) FROM 1887 TO 1910

the Department of Mines in 1906. In this report, it is estimated that the Slocan district of British Columbia could probably produce about 15,000 tons of ore of fifty per cent. zinc per annum, and that the Ainsworth camp could produce from 16,000 to 30,000 tons of the same grade of ore per annum. The following are a few extracts from the same report:[a]

> "The majority of the mines of the West Kootenay are, however, essentially silver-lead mines, in which zinc blende occurs as an accessory ore. In this respect they differ in no wise from many other mines in the Rocky mountains from British Columbia to Mexico, in which zinc blende occurs in association with galena, pyrite and other argentiferous and auriferous minerals. The wide-spread and abundant occurrence of zinc in these ores is indicated by the *slags made in silver-lead smelting in the United States*, which average *about* 6 *per cent. zinc oxide, or approximately* 5 *per cent. metallic zinc.* Estimating the smelting of 2,500,000 tons of ore per annum, which is considerably under the quantity now actually treated, and the product of 0.9 ton of slag per ton of ore, there is *annually discarded in this form about* 112,500 *tons of zinc*, which is the result after the zinc ore has been so far as possible culled out by the miner, or left behind in his stopes."

In speaking of the mines, the report says:

> "The silver-lead ore is generally of high-grade silver, which has made it possible to operate certain of the mines at the excellent percentage of profit that has been shown most brilliantly by the Payne and Slocan Star.
>
> "However, it has been the failure to recognize the true conditions which has been the cause of many disasters in the district. Many properties have been developed in too ambitious a manner. Long cross-cut tunnels have been driven at large outlay of money, which has not been justified by the advantage to be gained. Mills of too large capacity have been built, and attention in their design has been directed toward reduction of operating cost of per ton of ore, *rather than toward securing the maximum percentage of the valuable minerals of the ore*, which should have been the chief consideration in the concentration of these rich and difficult ores. This error in mill design appears to have been due to a mistaken following of the practice in the Cœur d'Alene district of Idaho, where the conditions as to ore deposits, character and grade of the ore are radically different from those which obtain in the Slocan. The large number of mills standing idle throughout the Slocan, in spite of the bounty on lead ore, is the best possible evidence of the mistakes of the past. In future attempts to re-open these mines with a view to augmenting the yield of argentiferous galena by the marketing of argentiferous blende as a by-product, it is important that profit be taken of previous experience. Operations must be inaugurated tentatively. Large outlays in dead-work must be avoided. Prospecting in the veins must be pushed boldly and must always be kept well ahead of stoping.

[a] See pp. 41-42. The italics are the writer's.

Installation of plant, either mining or milling, must be carefully considered with respect to the probability of reimbursement of the cost of the plant. If there be only 100 tons of ore to be hoisted out of shaft, it is both better engineering and better business to raise it by windlass than to buy a steam hoist, and this same principle obtains throughout mine operation."

CONSUMPTION.—The consumption of zinc in Canada is comparatively small, but is increasing. The imports (which may be taken as representing the consumption) were 4,298 tons in the fiscal year 1908, against 3,154 tons in 1905. It has been estimated that Ainsworth and the Slocan are capable of producing 30,000 tons of zinc-blende per annum of an average zinc content of about fifty per cent. This would correspond to a smelter production of upward of 12,000 tons, or nearly equal to three times the present consumption of the Dominion. As the future production depends to a large extent on the successful smelting of these ores in British Columbia, the Dominion Government is carrying on experiments with a view to successfully smelting these ores.

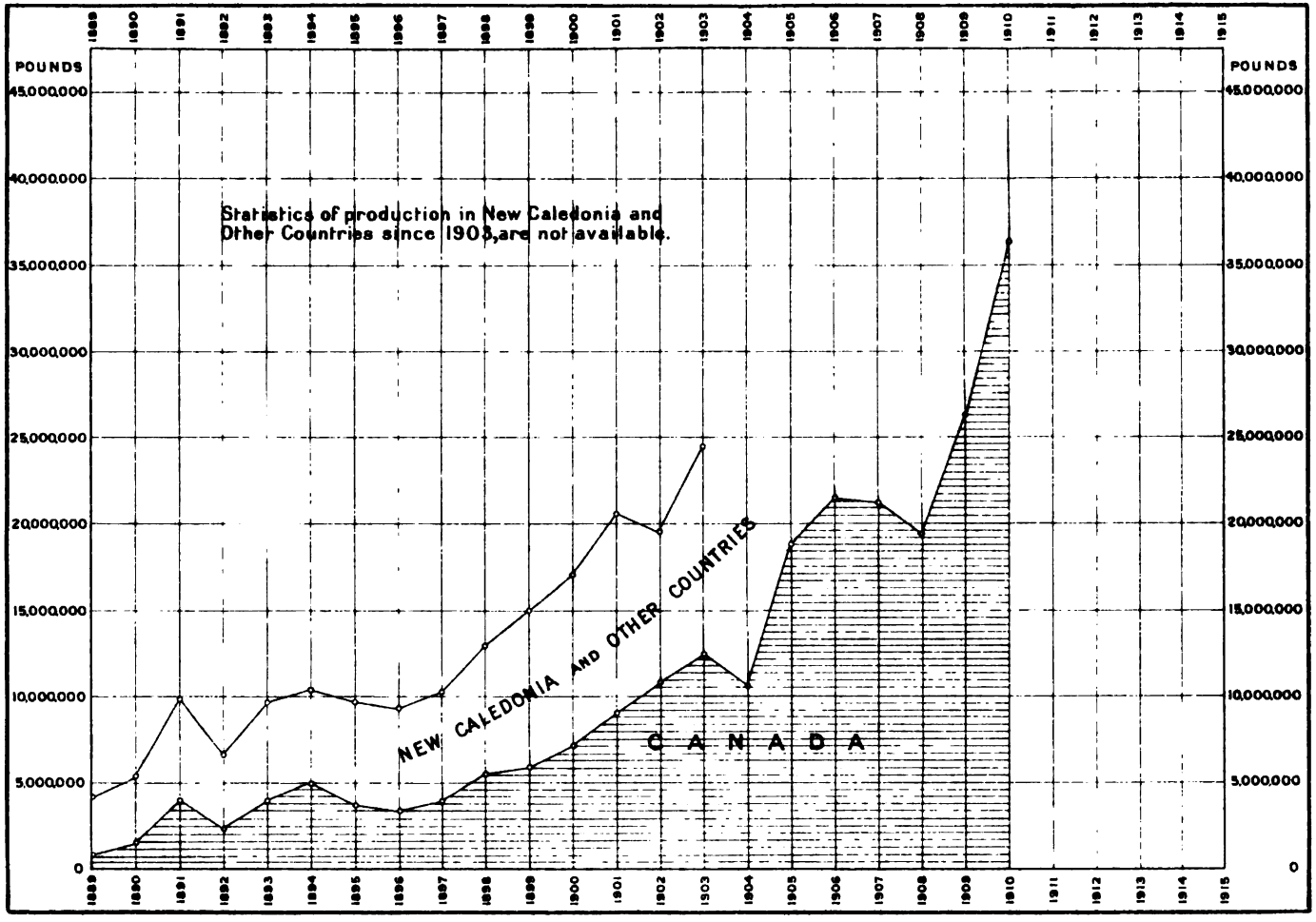
Nickel

PRODUCTION OF CANADA.—With the exception of the nickel contained in the ores shipped from the Cobalt district, the production of nickel in Canada is derived entirely from the well-known nickel-copper deposits of the Sudbury district, Ontario. The diagram (Plate X) shows graphically the annual production of nickel in Canada for the last twenty years. From 830,747 pounds in 1889, the production increased rapidly to 1903, when it was 12,505,510 pounds, an average increase of over 800,000 pounds per annum for fourteen years. From 1904 to 1910, the output rose rapidly (except for a small setback in 1908) at an average increase of over 4,400,000 pounds per annum. In 1910, the production reached 37,271,033 pounds.

PRODUCTION OF THE WORLD.—The world's production of nickel was 4,197,558 pounds in 1889, and about 35,500,000 pounds in 1909. The upper line in the diagram represents the world's production in the same time, and it well illustrates the increase in production. (See Plate X.) The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway and the United States, comes from New Caledonian and Canadian ores. In 1909, the supply from each of the latter countries was 9,217,009 pounds and 26,282,991 pounds respectively.[a] The increase in the world's production of nickel has been due to the extensive use of nickel alloys. Nickel steel is now being used for armour plates, steel rails and for machine parts subjected to reversals of stresses, and where increase of strength and decrease of weight are desired.

RESOURCES OF CANADA.—The nickel deposits of the Sudbury district supplied over seventy-four per cent. of the world's production of nickel

[a] Estimated from smelter production.



NICKEL PRODUCTION OF THE WORLD AND OF THE PRINCIPAL COUNTRIES FROM 1889 TO 1910

in 1909. The remainder is largely derived from the silicate ores of New Caledonia. The nickel-bearing rocks of the Sudbury district, with a width of about two-and-a-half miles, form a rude ellipse thirty-six miles long and thirteen miles broad. The ores consist mainly of a mixture of pyrrhotite and chalcopyrite intimately associated with more or less country rock. The nickel occurs in the pyrrhotite as pentlandite and varies in amount from two to five and a half per cent. The ore deposits are of three main types—marginal deposits, offset deposits and vein-like deposits. The Creighton mine, which may be called the greatest nickel mine in the world, is an example of a marginal deposit. The Copper Cliff mine is an example of an offset deposit, while the Vermilion mine is probably the best example of a vein-like deposit and has probably been formed by hot circulating waters. Cobalt in the proportion of one to fifty of nickel is found associated with the nickel and copper in the ore. In addition, these ores contain appreciable quantities of the precious metals—gold, silver and metals of the platinum group. The principal companies engaged in mining and smelting the nickel ores are: The Canadian Copper Company (International Nickel Company), of Coppercliff, Ontario, and New York; and the Mond Nickel Company, Victoria Mines, Ontario, and London, England.

Nickel also occurs in considerable quantity in the rich silver ores of the Cobalt district. In 1908, it is estimated that there were 612 tons of nickel raised in the Cobalt silver mines. Nickel has been found in small quantities in nearly every province in Canada. While it is believed that the supply of high-grade nickel ore of the Sudbury district is sufficient to meet requirements for many years to come, a demand for larger quantities of nickel would stimulate prospecting, not only in the Sudbury region, but also in the area of similar crystalline rocks situated to the north of Sudbury and in the region through which the Timiskaming and Northern Ontario railway passes, with the probable result that many more new deposits would be discovered. In 1908, a new nickel area of small extent was discovered at mileage 222 on the Timiskaming and Northern Ontario railway. The discovery was of considerable scientific interest, as the ore was found associated with a basic eruptive rock serpentine, originally an olivine rock. The Sudbury nickel deposits are associated with a rather acid variety of norite. The nickel ores of New Caledonia are derived from serpentine. Regarding the extent of this new area, Dr. A. P. Coleman, who examined the find in 1909, speaks thus:[a]

> "How extensive the nickel-bearing serpentine may turn out to be one cannot at present even guess; but much larger areas of the parent rock may exist than have yet been disclosed, and correspond-

[a] Report of Bureau of Mines of Ontario, 1909.

ingly large ore bodies may possibly be found at some other point now buried under the widespread mantle of drift which covers the region."

CONSUMPTION.—The ores of the Sudbury district are smelted and blown to a matte in Canadian smelters. The matte, averaging about forty-five per cent. nickel and thirty-five per cent. copper, is shipped to the United States and Great Britain, where it is refined.

According to Customs returns, the number of pounds of nickel exported in matte, for twelve months ending December 31, was as follows:

EXPORTS OF NICKEL, 1908-1910

	1908	1909	1910
To Great Britain	2,554,486	3,843,763	5,335,331
To United States	16,865,407	21,772,635	30,679,451
	19,419,893	25,616,398	36,014,782

The imports of nickel and nickel anodes amounted to $15,976 in 1906; $19,511 in 1907; $36,870 in 1908; $14,930 in 1909; and $23,310 in 1910.

WASTE.—It is not believed that the waste in mining is very great. The greatest waste occurs in the roasting and smelting of the ores. These contain great quantities of iron; but it is always combined with sulphur, chiefly in the form of pyrrhotite, which contains 60.4 to 61.6 per cent. of iron when pure. If it were not for the difficulty in completely removing the sulphur, pyrrhotite would be a valuable ore of iron, and the nickel mines would also be iron mines, some of them comparable in tonnage and percentage of the metal to important iron mines in other regions. The following extract from the *Report on the Nickel and Copper Deposits of the Sudbury Mining District* clearly illustrates the waste which occurs in the roasting of these ores;[a]

"The metallurgical treatment of this ore commences at the roast yard, whither it is conveyed from the mines, and being piled in convenient heaps, on previously laid cordwood, is exposed at high temperatures, without fusion, or at most incipient fusion, to the action of currents of air. The object of this roasting is to bring about the oxidation of the iron, and incidentally of the sulphur, as complete as is possible without involving an undue loss of metal in the slags of the following smelting; and second, the expulsion of

[a] *The Nickel and Copper Deposits of Sudbury Mining District*, by Dr. A. E. Barlow, Geological Survey of Canada, No. 873.

arsenic, if any should happen to be present. With the possible exception of the Worthington mine, and some other deposits in that vicinity, none of the ore of the Sudbury district contains any appreciable amount of arsenic or antimony. If the oxidation be very imperfect, the resulting matte will contain so much iron that its bringing forward will be unduly costly, while if the oxidation be too thorough, an undue loss will occur on smelting the roasted ore. At Copper Cliff and at Victoria mines, the Canadian Copper Company and Mond Nickel Company have spared neither trouble nor expense in the construction and equipment of their roast yards. The sites selected consisted of flats or swamps, which have been further graded or filled up, any natural roughness or unevenness being cleared away and levelled, and the whole being given a gentle slope, with carefully made drains, serves to remove at once any rain or surface water. These precautions have to be taken to prevent loss of metal as soluble sulphates. It has been frequently stated that any great loss is thus fully guarded against; but, so far as known, no deliberate attempts have been made to determine what amount is thus actually carried off by rain and melting snow. After the heap has been fired, a crust rapidly forms, which is believed to give further assistance against loss; but during heavy or long continued wet and stormy weather, it is believed an appreciable amount is thus removed. Whether the saving of this is a commercial possibility is well within the range of experiment. Hollows in the burnt out heaps are filled with stalactites, an analysis of one of which gave Mr. Donald Locke the following composition:—CuO, 8.42 per cent.; NiO, 10.21 per cent.; FeO, 7.18 per cent., and SO_3, 27.53 per cent. The water, too, of the marsh adjoining has a decidedly bluish tinge, and an iron object immersed in it is immediately covered with a thin coating of copper."

This loss of sulphur, copper and nickel seems unavoidable at present, and while the smelting men recognize these losses the standpoint naturally taken is, that if it cannot be recovered at a profit, it had better not be recovered at all. The sulphur cannot be recovered from heap roasting on account of it being eliminated over a wide area. In the manufacture of sulphuric acid, the sulphur dioxide must be eliminated within a narrow compass. Pyritic smelting affords the best means for doing this. The process has been developed to successful commercial practice by the Sulphur, Copper and Iron Company, Ltd. The ore treated is a pyrrhotite and varies almost daily from fourteen to nineteen per cent. sulphur, averaging about sixteen per cent. sulphur. This plant has a normal rated capacity of 160 tons 60° B. acid per day.

The profitable exploitation of the by-product gases at any given smelter is limited by (1) a freight rate to point of consumption, at which point the manufacturer of the by-product acid and the regular manufacturer will be on the same footing; (2) the fact that the sale of such by-product acid must be in a territory which cannot be more profitably entered by any other smelter manufacturing by-product acid. Where

there is a market for sulphuric acid, its production by this means is profitable. At the present time it is improbable that the Canadian market can absorb an increased output of acid. Sulphuric acid is also used in the manufacture of superphosphate fertilizers, and it is reasonable to suppose that in the near future the farming population of Canada will require large quantities of this valuable and necessary product. The pulp manufacturers use large quantities of sulphur, and, if an economically commercial method could be devised whereby sulphur could be extracted from the by-product gases of a smeltery, there would be a large home market for it.

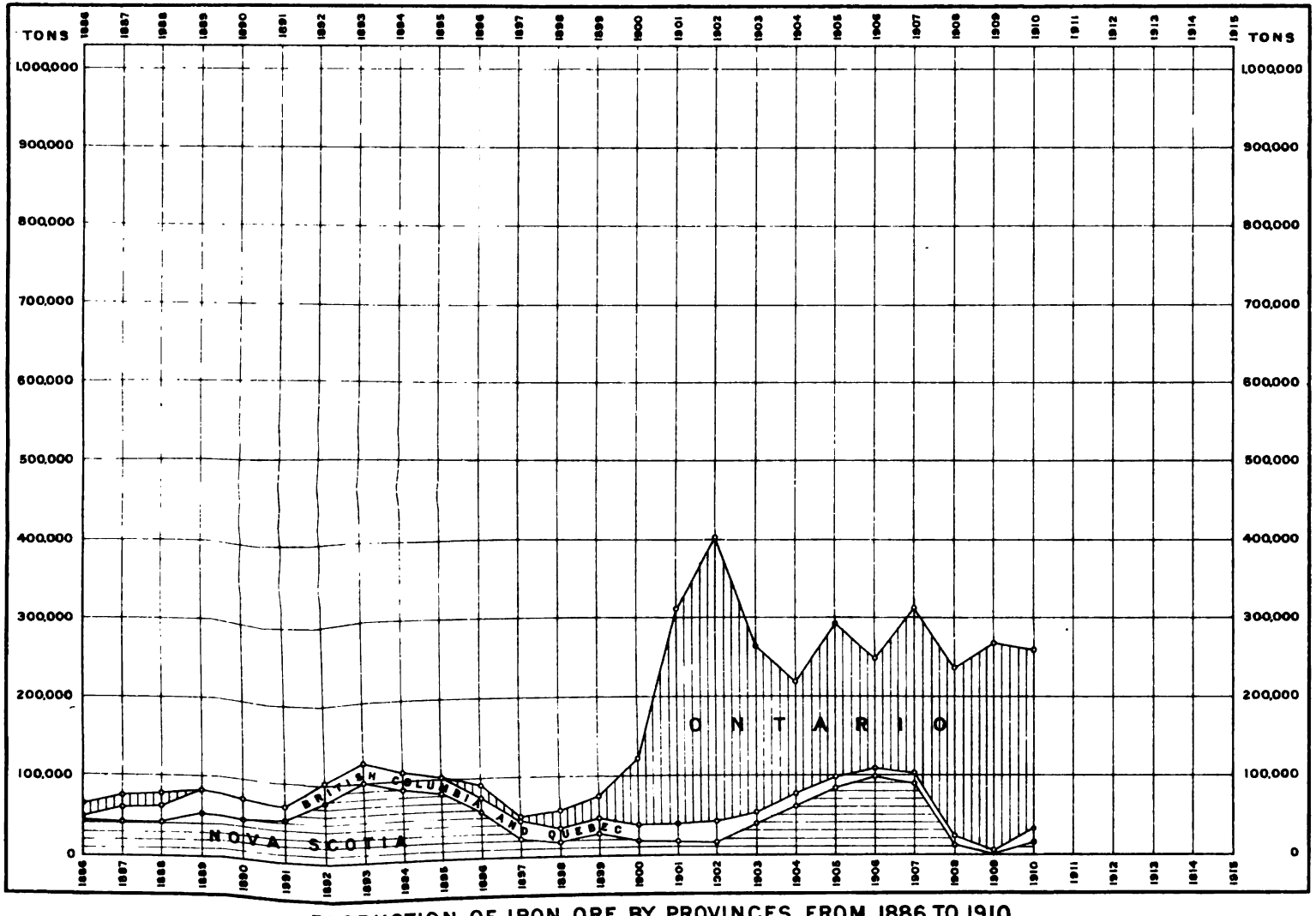
Iron

PRODUCTION OF CANADA—The production of iron ore in Canada has increased from 64,000 tons in 1886 to 258,000 tons in 1910. The diagram (Plate XI) shows the production by provinces from 1886 to 1910. The diagram (Plate XII) shows the annual production of pig iron from 1887 to 1910. By comparing these diagrams, it can be seen that the annual production of iron ore is not nearly sufficient to maintain the annual production of pig iron. In 1909 only about seventeen per cent. of the iron ore used in Canadian furnaces was of domestic origin. The total value of the imports of iron and steel goods as compiled from the annual report of Trade and Navigation during the fiscal year ending March, 1910, amounted to nearly $60,000,000.

For the methods at present employed on this continent in the production of pig iron and steel, cheap metallurgical fuel is a necessity; hence blast furnaces are erected only where iron ore and flux can be cheaply assembled. This condition exists only in the extreme east and west of the Dominion. Ontario and Quebec, while possessing the iron deposits and fluxes, lack the necessary metallurgical fuel. For the economic smelting of these ores it would be necessary to use either a peat coke or the electro-thermic process.

To quote from a paper in the First Annual Report of the Commission of Conservation, by Dr. Haanel, Director of the Mines Branch:

"The comparatively recent investigation of the electro-thermic process for the smelting of iron ores have demonstrated that only one-third of the carbon necessary in the blast furnace is needed in electric furnaces. This brings the cost of the metallurgical fuel required for smelting down to a reasonable figure. The adoption, therefore, of this process would lead, not alone to the utilization of our domestic iron ores in the provinces of Ontario and Quebec, but would greatly conserve our fuel supply by substituting hydro-electric energy for the heat energy of two-thirds of the carbon required in the blast furnace."



PRODUCTION OF IRON ORE, BY PROVINCES, FROM 1886 TO 1910

Dr. Haanel has done much work in investigating electric smelting and the results are contained in the several reports on this subject issued by the Mines Branch, Department of Mines.

In order to encourage the iron industry, the following Act respecting Bounties on Iron and Steel made in Canada was passed in 1907.[a]

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz:—

(a) In respect of pig iron manufactured from ore, on the proportion from Canadian ore produced during the calendar year—

1907	$2.10	per ton.
1908	2.10	"
1909	1.70	"
1910	0.90	"

(b) In respect of pig iron manufactured from ore, on the proportion from foreign ore produced during the calendar year—

1907	1.10	per ton.
1908	1.10	"
1909	0.70	"
1910	0.40	"

(c) On puddled iron bars manufactured from pig iron made in Canada during the calendar year—

1907	$1.65	per ton.
1908	1.65	"
1909	1.05	"
1910	0.60	"

(d) In respect of rolled, round wire rods not over three-eights of an inch in diameter, manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, when sold to wire manufacturers for use or when used in making wire in their own factories in Canada, on such wire rods made after the thirty-first day of December, one thousand nine hundred and six, six dollars per ton.

(e) In respect of steel manufactured from ingredients of which not

[a] 6-7 Ed. VII, Chap. 24.

less than fifty per cent of the weight thereof consists of pig iron made in Canada, on such steel made during the calendar year—

1907	$1.65	per ton.
1908	1.65	"
1909	1.05	"
1910	0.60	"

2. No bounty shall be paid under the foregoing provisions in respect of iron or steel made in Canada by electric process after the thirty-first day of December, one thousand nine hundred and eight.

3. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz:–

(a) On pig iron manufactured from Canadian ore by the process of electric smelting during the calendar year—

1909	$2.10	per ton.
1910	2.10	"
1911	1.70	"
1912	0.90	"

(b) On steel manufactured by electric process direct from Canadian ore, and on steel manuafctured by electric process from pig iron, smelted in Canada by electricity from Canadian ore during the calendar year:

1909	$1.65	per ton.
1910	1.65	"
1911	1.05	"
1912	0.60	"

2. Bounty, as on pig iron under this section, may be paid upon the molten iron from the ore which in the electric furnace enters into the manufacture of steel by the direct process, the weight of such iron to be ascertained from the weight of the steel so manufactured.

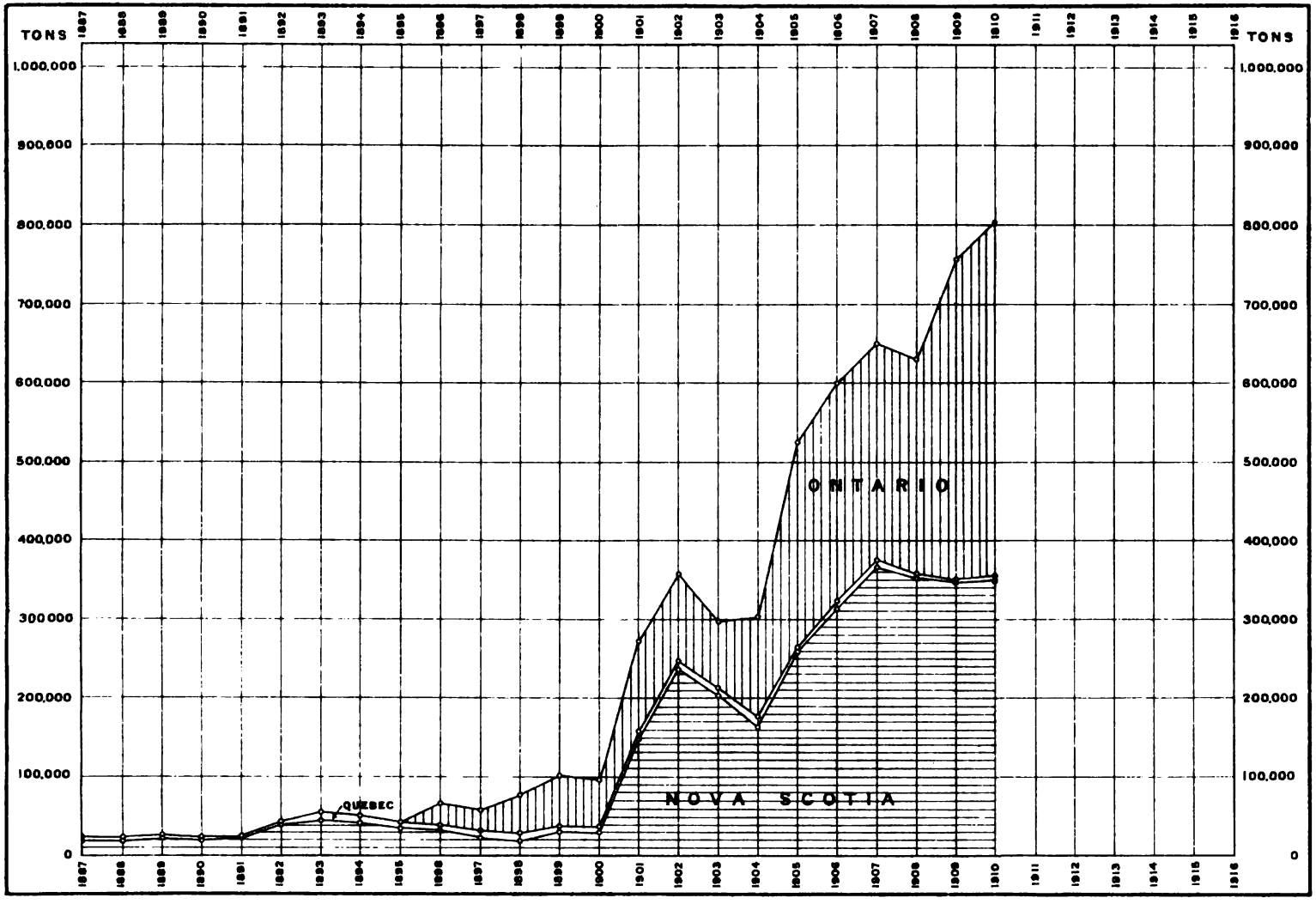
3. No bounty shall be paid on steel ingots from which steel blooms and billets for exportation from Canada are manufactured.

4. The Governor in Council may make regulations to carry out the intention of this Act.

5. The Minister of Trade and Commerce shall be charged with the administration of this Act.

6. Chapter 8 of the statutes of 1899, chapter 68 of the statutes of 1903, and chapter 39 of the statutes of 1904, are repealed.

7. This Act shall be deemed to have come into force on the first day of January, one thousand nine hundred and seven.



ANNUAL PRODUCTION OF PIG IRON, BY PROVINCES, FROM 1887 TO 1910

IRON ORE RESOURCES OF THE WORLD.—In order to obtain a comprehensive survey and estimate of the known and recorded stock of iron ore of the entire world so that the supply of such an important mineral could be husbanded and utilized in the most economic manner, the Executive Committee of the Eleventh Geological Congress undertook, with the assistance of the different geological surveys and experts in mining geology, to draw up a report on the subject. The following are extracts from the "Summary of the Reports," compiled by Professor Hjalmar Sjogren:

"In the circular sent out by the Representatives for Mining Geology in the Swedish Executive Committee, it has been proposed 'that the statistics may be classified into different groups of exactitude. In group A should be included such cases in which a reliable calculation of the extent of the deposit, based on actual investigations, has been carried out; group B should include those deposits in which only a very approximate estimate can be arrived at; and group C should contain such deposits as cannot be represented in figures at all.' The table below shows to what extent the reports received belong to one or the other of these groups, and illustrates our present knowledge of the iron ore occurrences on the surface of the earth.

IRON ORE RESOURCES OF THE WORLD

Quarters of the globe	Total areas of the quarters of the globe km²	Group A km²	Group B km²	Group C km²	Not included in the inquiry km²
Europe	9,724,321	9,063,725	260,333	166,520	233,743
America	38,323,629	7,851,470	10,689,348	7,605,631	2,177,180
Australia.....	8,948,120	——	1,296,661	6,667,500	983,959
Asia	44,179,400	452,922	218,200	31,807,388	11,700,890
Africa	29,758,100	——	1,057,400	11,373,000	17,327,700
Totals.....	130,933,570	17,368,117	13,521,942	67,620,039	32,423,472

"From these figures it can thus be calculated that the area of the continents and archipelagoes, the polar regions left out of consideration, which is covered by

reports of group A amounts to. ..... 13.3 per cent.
" " " B " " ..... 10.3 "
" " " C " " ..... 51.6 "
not accessible for the present inquiry.... 24.8 "

Total.....100 per cent.

"The total amount of the iron ore resources of the world known and recorded in the reports received by the Executive Committee is made clear by the following table."

WORLD'S SUMMARY, IRON

	Actual reserves		Potential reserves	
	Ore [a] MT.	Iron MT.	Ore MT.	Iron MT.
Europe	12,032	4,733	41,029	12,085 + considerable
America	9,855	5,154	81,822	40,731 + enormous
Australia	136	74	69	37 + considerable
Asia	260	156	457	283 + enormous
Africa	125	75	many thousands	many thousands + enormous
Totals	22,408	10,192	> 123,377	> 53,136 + enormous

"Out of these figures we wish for the moment to direct our attention to those representing the world's total actual known and recorded iron reserves, which, according to the table, amount in round figures to about 10,000 M.T. As the production of pig iron at present can be put down at about 60 M.T. yearly, the supply hitherto known of actual resources would not be sufficient for two hundred years on the supposition that the production of pig iron remained stationary.

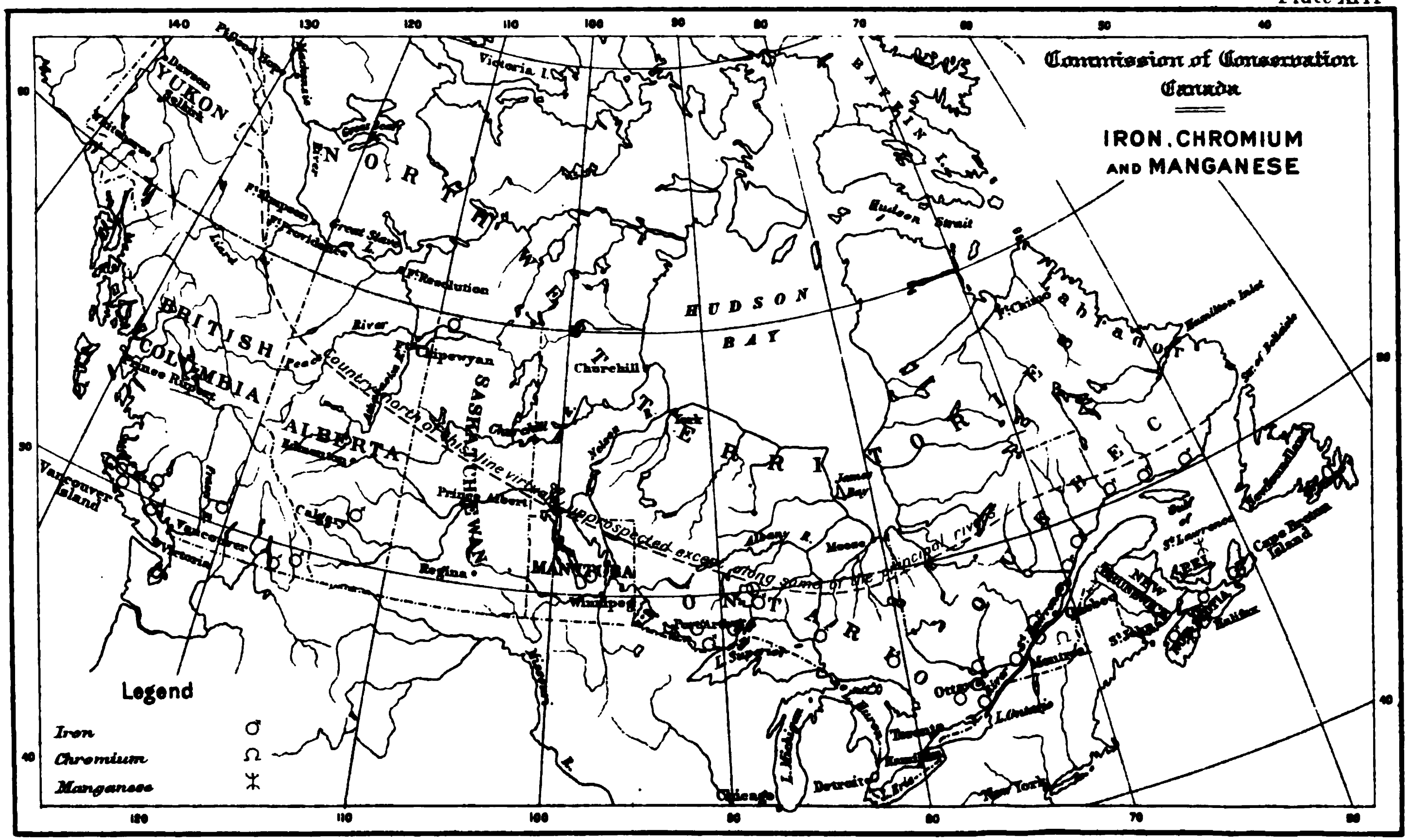
"The consumption of iron shows, however, on the whole a considerable increase, as will be seen from the table below of the development of the production of pig iron during the 19th century and up to date in all countries of the world:

In the year	1800....	0.8 M.T.	In the year	1891...	26.2 M.T.
" "	1850....	4.8 "	" "	1901...	41.2 "
" "	1871....	12.9 "	" "	1909...	about 60 "

"As will be seen from this, the production of pig iron has, on the whole, risen geometrically, so that it has been more than doubled in every twenty years. If we were allowed to suppose that the consumption of iron in the future will rise at the same rate, the present actual iron ore resources would, in the event of their being drawn upon exclusively, be sufficient to supply the requirements of iron of the world only for about 60 years. But evidently, during the lapse of such a period, a great part of the potential reserves will become available for the industry by reason of the extension of communications and the progress of our technical knowledge—they will pass to the actual group in the same manner as also a great portion of the hitherto unknown ore reserves in the districts belonging to groups B and C will be possible to draw upon.

"To what extent the future production of iron will become dependent upon low-grade ores, and also upon the progress of our technical knowledge, by which iron ores that are at present valueless (*i.e.*, potential ore reserves) may be utilized, becomes still more apparent from the table below showing the comparatively small remaining supplies of ores which contain more than 60 per cent. of iron."

[a] MT is used to represent one million tons.


Commission of Conservation
Canada
IRON. CHROMIUM
AND MANGANESE
Legend
Iron
Chromium
Manganese
YUKON
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NORTH WEST TERRITORIES
HUDSON BAY
Hudson Strait
Victoria I.
Churchill
Fort Chipewyan
Prince Albert
Regina
Calgary
Edmonton
Winnipeg
Vancouver Island
Vancouver
Victoria
Chicago
Detroit
Toronto
New York
L. Michigan
L. Ontario
L. Superior
James Bay
Albany R.
Moose
Cape Breton Island
Gulf of St. Lawrence
New Brunswick
Quebec
Montreal
Ottawa
Halifax
Labrador
Hamilton Inlet
Ft. Chimo
Country north of this line virtually unprospected except along some of the principal rivers

CHIEF KNOWN AND RECORDED ORE DEPOSITS WITH ORE OF SIXTY PER CENT. OR MORE

(The potential reserves are in brackets)

	SUPPLIES OF IRON ORE Million Tons	MEAN PERCENTAGE OF IRON	METALLIC IRON IN THE IRON ORE Million Tons	REMARKS
EUROPE—				
Russia Krivoy Rog.	86	—	53.5	
Caucasus ...	13	60	6.8	
Sweden, Northern	1,035 (123)	60—70	673 (80)	
Sweden Central and Southern Sweden	about 60	60	36	
AMERICA—				
Newfoundland				Enormous amounts of titaniferous magnetite with 65% Fe.
Mexico	about 55	60—70	about 30	
West Indies.....	3	about 60	1.8	
AUSTRALIA—				
West Australia	26	63—68	about 15	
South Australia	(21)		12	Fe + Mn > 60 p.c.
Queensland.....	(13)		7	Fe + Mn > 60 p.c.
Tasmania.....	23	about 64	15	
ASIA—				
Persia	(30)	60	(18)	
Br. India.....	(400)	64—68	(250)	
China.....	(100)	60—62	(60)	
Totals.....	about 1300 (687)		850 about (408)	

"From the table it is evident that about four-fifths of the known and recorded rich iron ores come on the deposits of Northern Sweden. The high-grade ores, such as, for example, Kiirunavaara, will, therefore, in future be very much in demand, and the possession of such ore resources will form a decisive factor in the competition in the market of the world."

RESOURCES OF CANADA

The map (Plate XIII) shows the distribution of the principal iron ore deposits of Canada. The iron ore reserves of Canada are enormous, but it is impossible to give any estimates of their volume and extent, as very little work has been done on their actual development.

The following is an extract from the pamphlet "The Production of Iron and Steel in Canada, 1909," by John McLeish, of the Department of Mines:

NOVA SCOTIA.—No iron ore is reported as shipped from mines in this Province during 1909. The furnaces at Sydney and North Sydney received their supplies of ore from Newfoundland chiefly, while the Londonderry furnace, which is usually run on local ores, was out of commission throughout the year.

The Canada Iron Corporation, Limited, continued to develop their properties at Torbrook, and a quantity of ore was taken out, although none was shipped.

A railway spur is now being built from the mines to connect with the Halifax and Southwestern Railway track at Nictaux, and ore shipments are to be made from Port Wade, at which place large ore pockets are to be constructed. The same company has acquired the iron deposits at Austin Brook, near Bathurst, New Brunswick. A railway has been constructed connecting the ore deposits with the Intercolonial railway and shipping piers built at Newcastle.

QUEBEC.—The production of bog ores in this Province is growing less year by year. During 1909, only 3,330 tons were shipped to furnaces, in addition to which a small tonnage of iron sands was shipped for experimental purposes.

A magnetometric survey was made of the Bristol mine, Pontiac county, by Mr. E. Lindeman, of the Mines Branch, and a special bulletin has been published giving the results thereof. No shipments have been made from this mine since 1897, but between 1889 and 1897, inclusive, according to returns made to this Department, the mine shipped 29,815 tons.

ONTARIO.—This Province shows a considerably increased tonnage in iron ore shipments in 1909, due chiefly to a larger output from the Helen mine. There were five shipping mines, as compared with four during 1908.

No shipments were made by the Wilbur, in Lanark county, but the Atikokan mines, west of Port Arthur, were reopened; while the Dominion Bessemer Ore Company, of Philadelphia, opened an iron property about twenty-three miles east of Port Arthur, on Thunder Bay, and shipped a quantity of ore in two grades, No. 1, running 52 per cent. iron, and No. 2 40 per cent. It is intended to equip the property with crushers and jigs, in order to prepare the ore for market and raise the percentage of metallic iron content.

From the Helen mine at Michipicoten, shipments were made to Hamilton and Saulte Ste. Marie exclusively, no ore being sent to the United States during 1909. The plant at the mine is now entirely electrically driven, taking about 400 H.P. The Moose Mountain mine, in Hutton township, shipped chiefly to the United States, although one shipment each was made respectively to Sydney, N.S., and Hamilton, Ont. Shipments were also made from the Mayo mine, in Hastings county, operated by the Canada Iron Corporation, Limited, under lease, the ore being shipped to Midland and Radnor.

Following is a list of the principal producers of iron ore:

Canada Iron Corporation, Ltd., Mark Fisher Bldg., Montreal.

E. H. Duval, Lévis, Que. (Guay P.O.)

Plate XIV

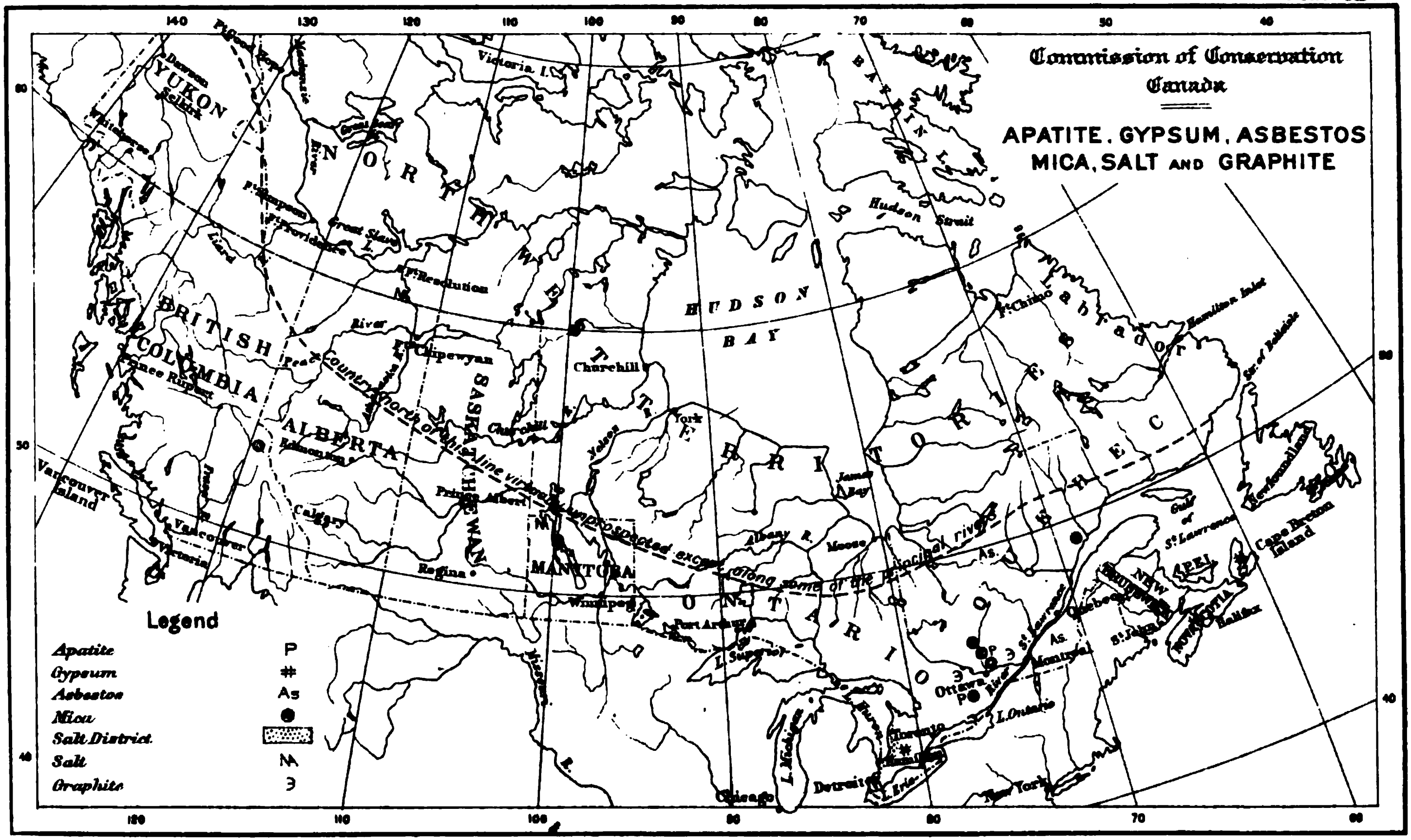
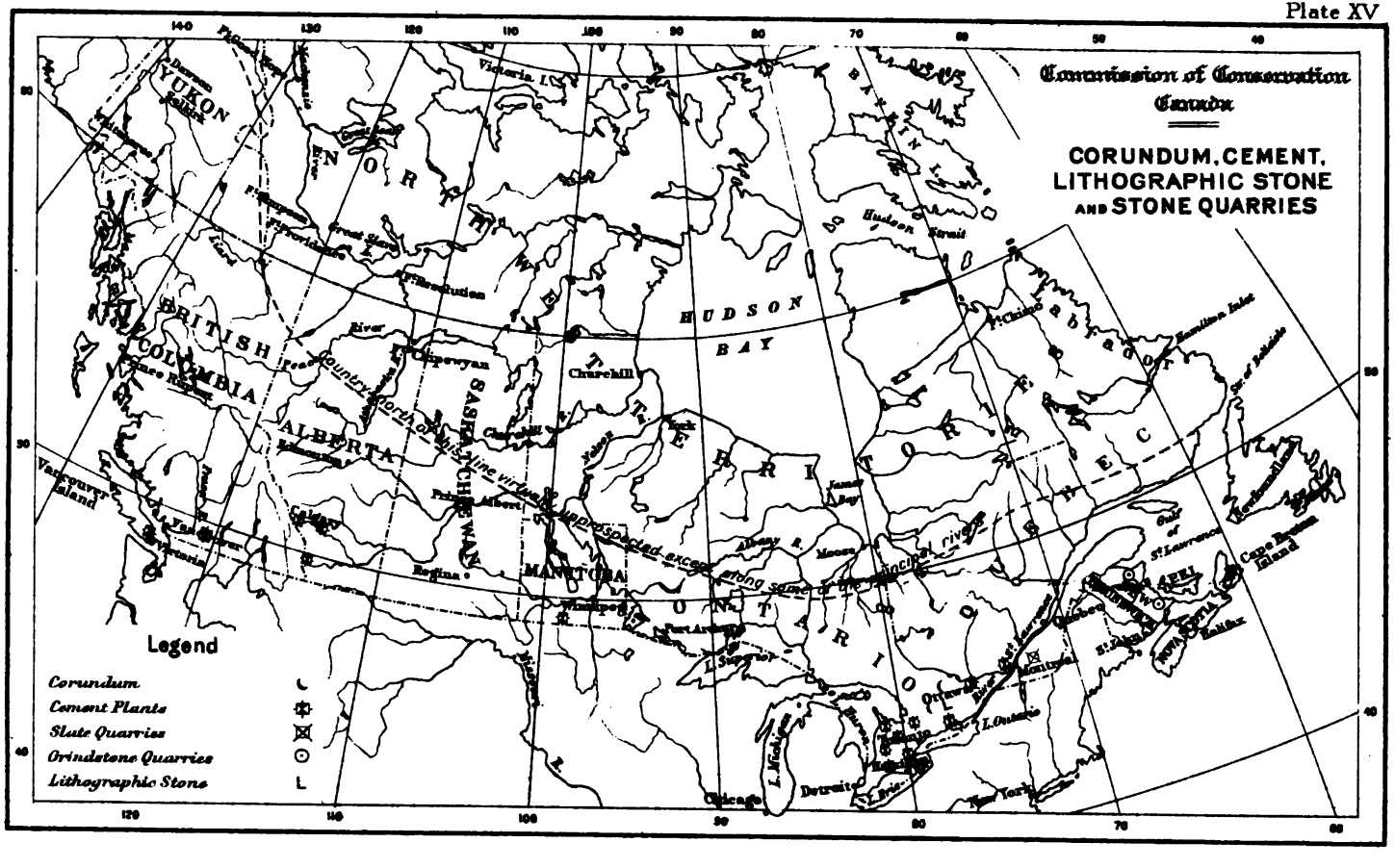

Commission of Conservation
Canada
APATITE, GYPSUM, ASBESTOS
MICA, SALT AND GRAPHITE
YUKON
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NORTH WEST TERRITORIES
HUDSON BAY
Hudson Strait
Labrador
Churchill
Winnipeg
Regina
Calgary
Edmonton
Vancouver
Victoria
Vancouver Island
Ottawa
Montreal
Quebec
Toronto
Chicago
Detroit
New York
Halifax
Cape Breton Island
Gulf of St. Lawrence
Legend
Apatite P
Gypsum #
Asbestos As
Mica
Salt District
Salt
Graphite

Plate XV


Commission of Conservation
Canada
CORUNDUM, CEMENT, LITHOGRAPHIC STONE AND STONE QUARRIES
YUKON
NORTHWEST TERRITORIES
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEW BRUNSWICK
NOVA SCOTIA
HUDSON BAY
Legend
Corundum
Cement Plants
Slate Quarries
Grindstone Quarries
Lithographic Stone

H. C. Bossé, 92 St. Peter Street, Quebec, Que.

Dominion Bessemer Ore Company, Ltd., 472 Bullitt Bldg., Philadelphia, Pa.

Lake Superior Power Company, Sault Ste. Marie, Ont.

Atikokan Iron Company, Ltd., Port Arthur, Ont.

Moose Mountain, Ltd., Sellwood, Ont.

NON-METALLIC MINERALS

The successful development of a non-metallic mineral deposit is generally more dependent upon conditions than is the case in the development of a metallic mineral. The metallic minerals are generally worth more in value per ton and the price is usually unaffected by local conditions of demand and supply. By reason of the increased value per ton, smaller deposits may be worked. Less money need be invested in the plant and larger dividends may be made on the outlay. Also, owing to the smaller tonnage produced, the cost of transportation to the market is not such a serious item.

Generally speaking, the following are essential for the successful exploitation of a non-metallic mineral deposit of low value per ton:

1. There must be a sufficiently large deposit of marketable material.
2. There must be a steady and permanent market for the product in the vicinity.
3. The transportation charges must not be high.
4. Cheap power must be obtainable for mining and for manufacturing the product.

On the other hand, while as large dividends cannot, in general, be made in non-metallic mines as in metal mines, the element of risk in the former is not so great as in the latter and the life of the undertaking is generally longer.

On account of the above mentioned conditions, less attention has been paid in Canada to the development of the non-metallic than to the metallic minerals; but, as the present tendency in building construction is towards the construction of fire-proof buildings, and, as it is in this class of work that the non-metallic minerals are so desirable, it is evident that there will be an increasing demand for such products.

Excepting coal, the total value of the non-metallic minerals produced in Canada in 1910 was about $26,000,000. The principal products with their relative values were: Portland cement $6,414,000; clay products, brick, sewer pipe, fire clay, drain tile, etc., $7,600,000; asbestos $2,459,000; stone for fluxes and building purposes $3,500,000; natural gas $1,312,000; lime $1,131,407; petroleum $388,550; gypsum $940,000; and salt $410,000.

In considering the conservation of our non-metallic minerals, it is necessary to divide them into two classes, inexhaustible and exhaustible. Of these, the first includes those minerals which occur so abundantly and are so widely distributed that no conceivable use will materially diminish the visible supply. Examples of these are limestone, clay, sand, building stone, and in general, minerals used as structural materials. The second class, the exhaustible minerals, includes those which, although in many cases they occur in very large quantities, nevertheless are definitely limited in distribution and amount. This class is exemplified by the fuels—gas, oil, coal and lignite—and the ores of asbestos, mica and phosphate.

It is with this latter class—exhaustible minerals,—with which conservation is chiefly concerned. Here it is necessary to weigh present demands against future needs, and to devise methods of utilization which shall neither sacrifice the interests of the future nor entail unnecessary present hardship. This can be accomplished in general, by utilizing the minerals (1) for the purpose for which they are most valuable, (2) in the manner that will secure the most efficient results, and (3) in the locality where the greatest economies can be effected.

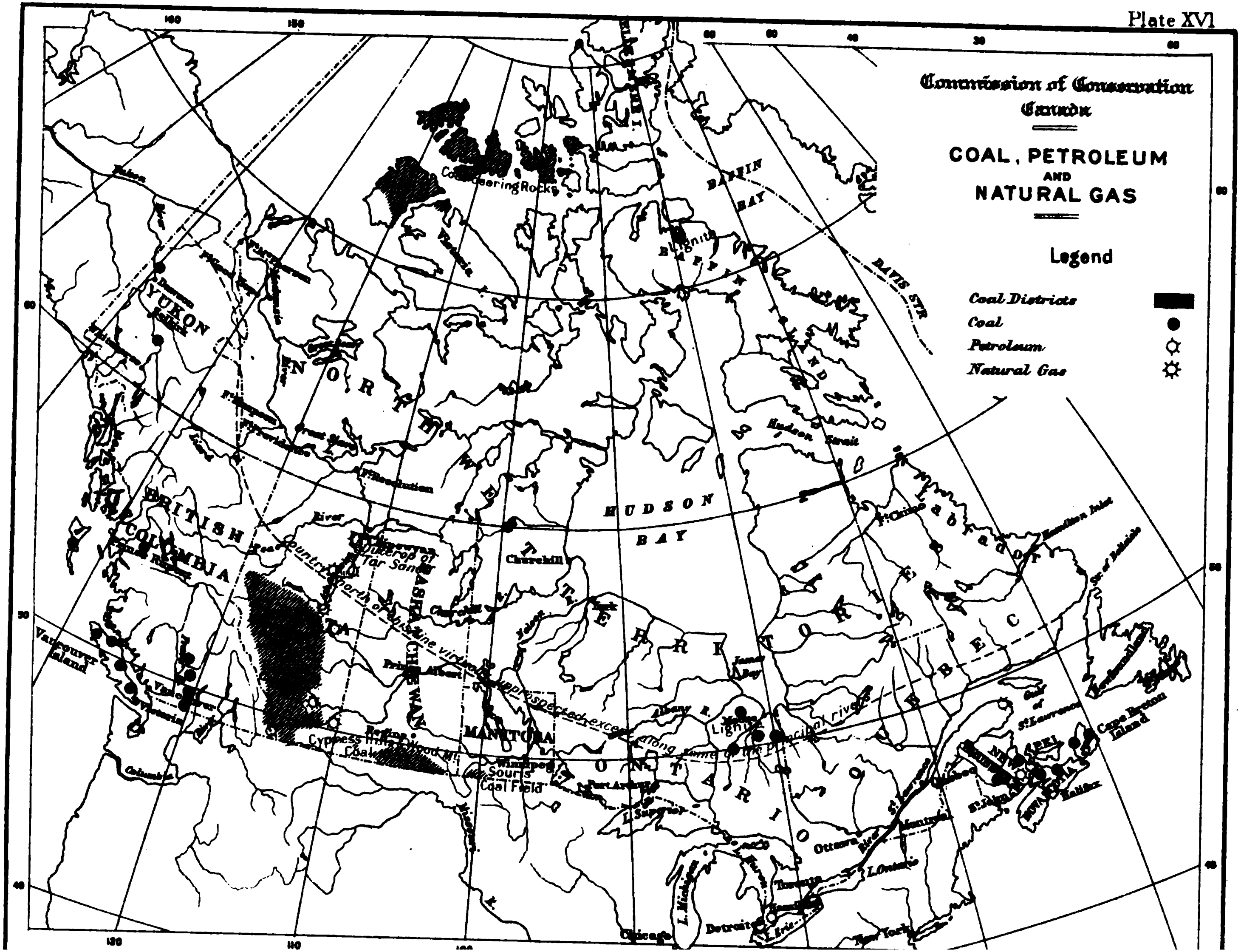
The maps (Plates XIV, XV and XVI show the location of the principal deposits of non-metallic minerals, in Canada.

Coal

In a country of such enormous proportions as the Dominion of Canada, extending from the Atlantic to the Pacific ocean, and northward to the Arctic ocean, with its severe but bracing winters, the question of an adequate fuel supply as a source of heat, light, power, and for use in metallurgical industries must always be of paramount importance. To a great extent the requisite of power and light can be supplied by the utilization of the numerous waterfalls with which Canada is so bountifully supplied. It has been estimated that the total water-power in Canada amounts to over 16,600,000 horse-power[a]. This is equivalent to a perpetual annual production of about 367,000,000 tons of coal. This last figure represents about 33 per cent. of the world's production of coal in the year 1909. Although electrical energy will, where available, to a great extent replace the use of coal for light and power purposes and for certain metallurgical work, the necessary uses of coal will continue on a large scale.

Power, coal and iron are the main bases of the greater portion of modern industries and Canada has large resources of all these essentials. The coal deposits of Canada compare favorably with those of the greatest coal mining countries of the world as to quality, quantity and accessibility

[a] The forthcoming Report on Water-Powers by the Commission of Conservation will contain an estimate based upon the latest available information, and will, therefore, be more accurate than this.


Commission of Conservation
Canada
COAL, PETROLEUM
AND
NATURAL GAS
Legend
Coal Districts
Coal
Petroleum
Natural Gas
YUKON
BRITISH
COLUMBIA
NORTH WEST TERRITORIES
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
Labrador
HUDSON
BAY
BAFFIN
BAY
DAVIS STR
BAFFIN LAND
Hudson Strait
Coal bearing Rocks
Lignite
Churchill
Prince Albert
Regina
Winnipeg
Souris
Coal Field
Cypress Hills
Wood Mt.
Coal
Outcrop of Tar Sand
Country north of this line virtually unprospected except along some of the principal rivers
Lignite
Port Arthur
L. Superior
L. Michigan
Chicago
Detroit
L. Erie
L. Ontario
Toronto
Ottawa
Montreal
Quebec
New York
Halifax
Cape Breton Island
Gulf of St. Lawrence
Vancouver Island
Columbia
James Bay
Albany R.
Hamilton Inlet
Str. of Belleisle
Pt. Chimo
Churchill
Nelson
York
Yukon
Victoria
River
Ft. Resolution
Great Slave L.
Ft. Providence
Ft. Simpson
Ft. Good Hope
Ft. McPherson
Dawson
Ft. Chipewyan
Peace
Liard
Vancouver
Victoria
N.B.
P.E.I.
N.S.
St. John
Missouri
R.
160
150
120
110
100
60
50
40
30
80

for mining purposes. According to estimates prepared by Mr. D. B. Dowling, of the Geological Survey of Canada, the known area underlain by workable coal beds in Canada is 29,957 square miles. The coal fields may be divided, for the sake of convenience in classification, into four main divisions, as follows (See Plate XVI).

(1) The eastern division, containing the bituminous coal fields of Nova Scotia and New Brunswick.

(2) The central or interior division, containing the lignites of Manitoba and Saskatchewan and the lignites, bituminous and anthracite coal fields of Alberta and the eastern Rocky Mountain region.

(3) The Pacific Coast and the Western mountains division, containing the semi-anthracite and bituminous fields of Vancouver Island; the bituminous coal fields of the interior of British Columbia and the lignites of Yukon.

(4) The northern division, containing the lignites of the Arctic-Mackenzie basin.

The coal areas of the different provinces and the estimated quantity of coal therein are shown in the following table:

COAL RESOURCES OF CANADA

Province	Area of Coal Land (in sq. miles).	Anthracite (in tons)	Bituminous (in tons)	Lignite (in tons)	Total (in tons)
Nova Scotia ...	992	.....	6,250,000,000	.....	6,250,000,000
New Brunswick	112	.....	155,000,000	.....	155,000,000
Manitoba	48	.....	.....	330,000,000	330,000,000
Saskatchewan .	7,500	.....	.....	20,000,000,000	20,000,000,000
Alberta	19,582	400,000,000	44,530,000,000	60,002,000,000	104,932,000,000
BritishColumbia	1,123	20,000,000	38,642,000,000	314,000,000	38,976,000,000
Yukon.	400	32,000,000	32,000,000	850,000,000	914,000,000
Mackenzie Dist.	200	.....	.....	500,000,000	500,000,000
Totals	29,957	452,000,000	89,609,000,000	81,996,000,000	172,057,000,000

The coal mining industry of Canada has developed at a very rapid rate. In 1874, the earliest year for which there is a reliable record, the production was 1,063,742 tons. Twelve years later, in 1886, it had doubled; after twelve years in 1898 the production had again doubled, 4,173,108 tons of coal being produced. From 1898, the production rose more rapidly, and in six years the production was again doubled, amounting to 8,254,595 tons in 1904. In 1908, the production was 10,886,311 tons, showing an increase of about 2,500,000 tons over 1904. This rate of increase is somewhat lower than for the previous few years on account of both 1907 and 1908 being unfavourable to the coal mining industry. While British Columbia and Alberta showed an increased production in 1909, the pro-

duction of all Canada showed a decrease of 384,836 tons, due to the decreased production of Nova Scotia, owing to labour troubles. In 1910, the production increased to 12,796,512 tons.

PRODUCTION OF THE WORLD.—The principal coal-producing countries of the world are: the United States, Great Britain, Germany, Austria-Hungary, France, Russia and Finland, Japan, Canada and New South Wales. The world's production has increased from 222,248,430 tons[a] in 1868 to 1,167,941,188 tons in 1908, or about four hundred per cent.

The production in 1908 (Plate XVII) was as follows:

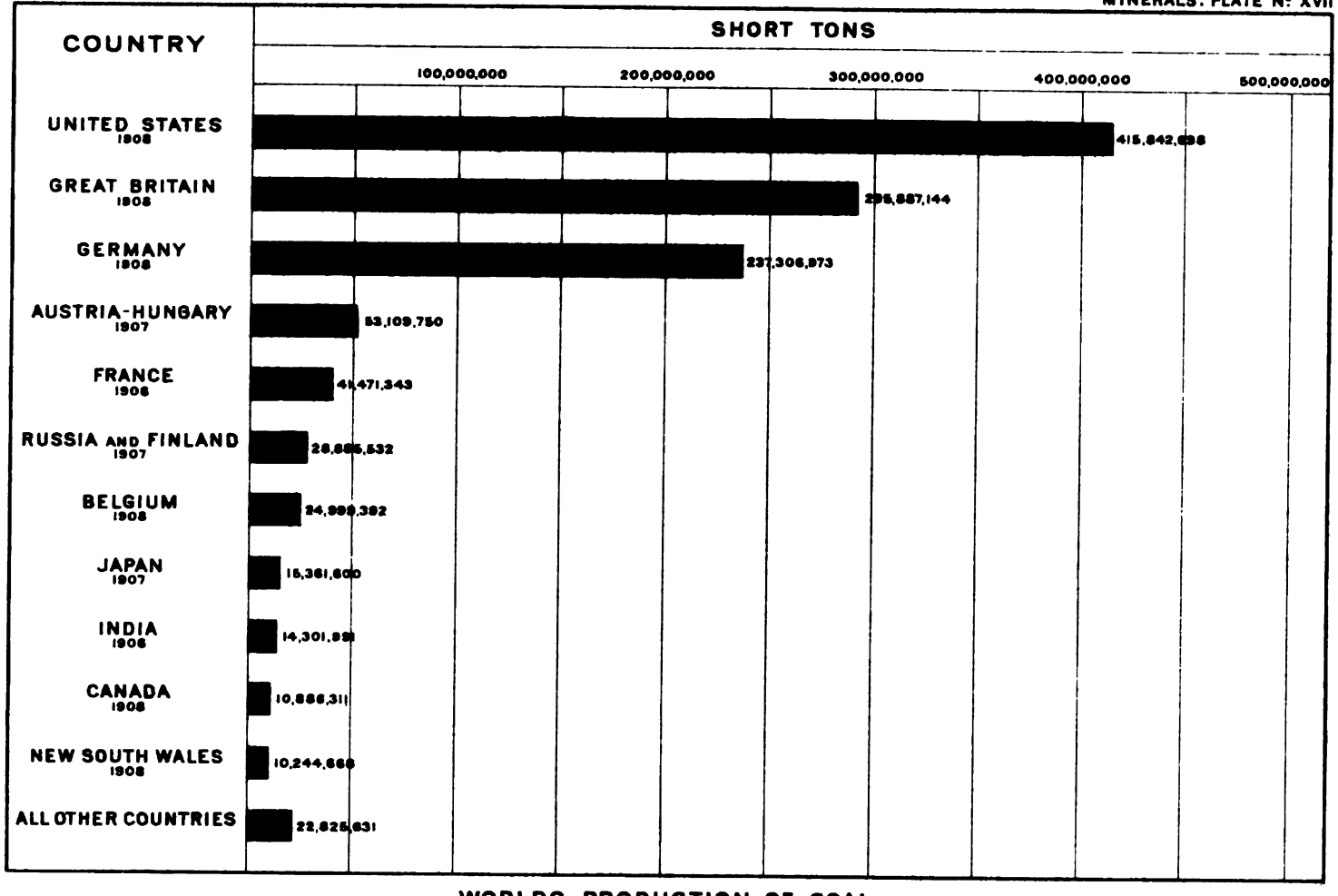
THE WORLD'S PRODUCTION OF COAL[b]

Country	Year	Usual unit in producing country	Equivalent in short tons (2,000 lbs.)
United States	1908	371,288,123 long tons	415,842,698
Great Britain	1908	261,506,379 " "	292,887,144
Germany	1908	215,283,474 metric tons	237,306,973
Austria-Hungary	1907	48,180,849 " "	53,109,750
France	1908	37,622,556 " "	41,471,343
Russia and Finland	1907	26,023,344 " "	28,685,532
Belgium	1908	22,679,300 " "	24,999,392
Japan	1907	13,935,952 " "	15,361,600
India	1908	12,769,635 long tons	14,301,991
Canada	1908	10,904,466 short tons	10,904,466
New South Wales	1908	9,147,025 long tons	10,244,668
Spain	1907	3,887,236 metric tons	4,284,900
Transvaal	1908	3,012,692 long tons	3,374,215
New Zealand	1907	1,831,009 " "	2,050,730
Natal	1907	1,530,043 " "	1,713,648
Queensland and Victoria	1907	964,229 " "	1,079,936
Mexico	1906	767,864 metric tons	846,416
Holland	1906	532,780 " "	587,283
Italy	1907	453,137 " "	499,493
Sweden	1907	305,338 " "	336,574
Cape Colony	1907	128,607 long tons	144,040
Tasmania	1908	61,068 " "	68,396
Other countries		7,000,000 " "	7,840,000
Total			1,167,941,188
Percentage for the United States			35.6

Germany shows the greatest increase in production in the four years ending 1908, namely, 45,500,000 tons, Great Britain and the United States coming next with increases of 28,500,000 and 23,000,000 tons respectively. British India is the greatest coal producer of the Empire, outside of Great Britain, Australia being second, and Canada a close third. The output of India is increasing at a much faster rate than that of any of

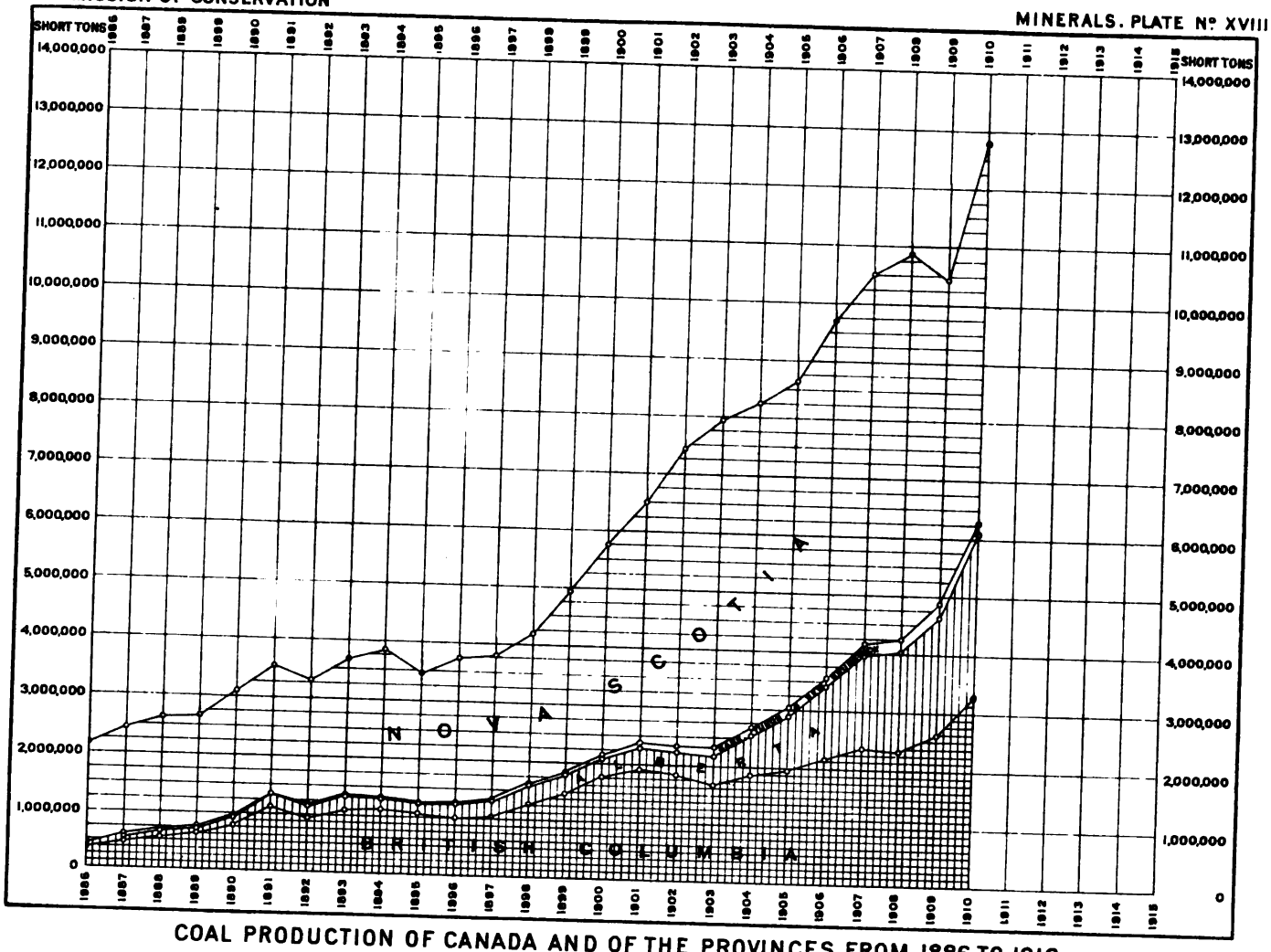
[a] A ton is a short ton of 2000 lbs.

[b] *Mineral Resources of the United States, 1908.*



WORLDS PRODUCTION OF COAL

AFTER MINERAL RESOURCES OF U.S. 1908



COAL PRODUCTION OF CANADA AND OF THE PROVINCES FROM 1886 TO 1910

the other over-seas Dominions. The output of India in the three-year period, 1907-09 increased 3,300,000 tons; Australia, 1,700,000; Canada, 1,100,000; New Zealand, 140,000, and Africa 90,000.

Resources of Canada

The diagram (Plate XVIII) shows that the production of Canada can, for present purposes, be divided into four parts. In 1910, Nova Scotia, British Columbia and Alberta, in the rank indicated, contributed 6,407,091 tons, 3,319,368 tons and 2,824,929 tons. The remainder, approximately 250,000 tons, came from Saskatchewan, New Brunswick and Yukon.

Nova Scotia.—In Nova Scotia, coal has been mined for more than 200 years. In 1872 the production was 1,003,806 short tons; in eighteen years (in 1890) the production had doubled, and eleven years later (in 1901) the production had again doubled. In 1910, the production was 6,407,091 tons, showing an increase of 755,002 tons over 1909. The coals of Nova Scotia belong to the Carboniferous formation, the largest workable seams belonging to the middle portion of that system, or to what is styled the Productive Coal Measures. This formation is found in several portions of the Province, chiefly at Sydney, on the north-east coast of Cape Breton, and in Richmond and Inverness, on the west side of the island; at Pictou, in the eastern part of Nova Scotia proper, and at Springhill and Joggins, which are in the north-west part of the the Province in Cumberland county. Seams of considerable size are found in the underlying portions of the Middle Carboniferous, otherwise known as the Millstone-Grit. Occasionally coal occurs in the Upper Carboniferous, or, as it is sometimes styled, the Permian, where coals, of no great thickness, have been recognized in that part of the counties of Colchester and Pictou which border on Northumberland strait. These small seams cannot, however, in the present state of the industry, be worked at a profit.

The reserves of Nova Scotia cannot be estimated with any degree of precision. The seams vary in thickness, and faulting is rather prevalent. It has not yet been ascertained whether the seams occur in small basins, or whether the coal was formed in extensive beds, like the Pittsburgh seam. Consequently, it cannot be definitely affirmed that coal will be found below the Permo-Carboniferous area. Another indefinite factor is the distance under the sea to which mining may be carried.

The distribution of the coal in New Brunswick and Nova Scotia suggests that the seams may have been continuous over a wide area, rather than formed in a number of isolated basins. If so, there is likely to be a large tonnage under the Permo-Carboniferous of Nova Scotia

and, possibly, of Prince Edward Island. Boring operations are in progress and, if coal is discovered, it will add greatly to the estimated reserves of the Maritime Provinces.

The coals of Nova Scotia are bituminous, of good quality, well adapted to the production of coke and excellent for domestic use and for steam coal.

The Sydney coal-field is one of the most important in Nova Scotia. It extends for thirty-two miles along the sea-coast of the north-eastern extremity of Cape Breton island, the measures having a width on land of about six miles. The aggregate thickness of coal in the several workable seams varies from 13½ feet in the Dauphin area to 44½ feet at Sydney harbour, the seams ranging from three to nine feet in thickness. The strata are almost free from faults and have a gentle dip seaward, so that a large area of submarine coal is available. The gently dipping strata are traversed by three anticlines, so that the coal seams lie in four basins —Cow Bay, Glace Bay, Sydney Harbour and Bras d'Or basins. In 1909, the Sydney coal-field produced 72.1 per cent. of the total production of Nova Scotia.

The coal fields of Inverness county include a series of narrow areas extending for over fifty miles along the western shore of Cape Breton island. The areas of the productive measures form part of the eastern rim of a basin, the greater part of which has been removed by erosion. The productive measures on their easterly side are underlain by the Millstone-Grit and various formations of the Lower Carboniferous, which in turn, rest on Cambrian rocks. At various localities, seams from 2 to 12 feet in thickness occur, usually with rather low angles of dip. In 1909, Inverness county produced 5·9 per cent. of the total coal production of the Province.

In Richmond county, situated on the south-west side of the island, important deposits of coal have been found. The seams are thick, but of rather poor quality.

The Pictou coal-field, on the mainland has an area of about twenty-five square miles, and has been producing coal for more than eighty years. Though the field is small, it comprises some of the largest seams in eastern America, the Main seam in the Stellarton area having a thickness of 40 feet, while several others in the vicinity vary in thickness from 10 to 20 feet. The geological structure of the district is very intricate; faults, often of considerable magnitude, are numerous, and the productive measures are almost completely girdled by them. In 1909, Pictou county produced 13.1 per cent. of the total coal production of Nova Scotia.

In Cumberland county there are two productive areas: the one, situated on the coast, may be called the Joggins area, while the other is at Springhill, about fifteen miles east of the first. In the Joggins area

the coal seams occur along one side of a very broad synclinal basin of Carboniferous measures, which, toward the centre of the basin, are overlapped by the Permian beds. In the western portion of Joggins area the seams are comparatively thin, the principal one worked showing about five feet of coal, and the lower seam somewhat less. In the remarkable section of strata exposed along the coast of Chignecto bay, over seventy coal seams outcrop. Several seams are 5 to 6 feet thick. One measures 9½ feet, but it has 2½ feet of shale partings.

In the Springhill basin the geological structure is less simple and the strata dip more steeply than in the Joggins area, the seams being worked along slopes of 30°. Here there are a number of seams, some of which are over ten feet thick. They have been worked for more than thirty years; while several others of workable size have been developed to some extent. In 1909, Cumberland county produced 8.9 per cent. of the total coal production of Nova Scotia.

New Brunswick.—In New Brunswick, the Carboniferous rocks have a wide distribution and comprise an area of more than 10,000 square miles. They form a triangular area with the base near the eastern boundary of the Province, extending from Bathurst on the north, to the Nova Scotia boundary line on the south; while the apex of the triangle is near the southwest portion of the Province. Thin coal seams outcrop at many points throughout this area. Near the upper portion of Grand lake where the coal has the greatest thickness, mining has been carried on for nearly a century. The coal production is comparatively small, owing to the thinness of the seams. The production has increased from 6,000 tons in 1898, to over 53,400 tons in 1910.

British Columbia.—While the coals of Nova Scotia and of the eastern half of the United States are derived from the Carboniferous formation, those of the Great Plains and Pacific Slope occur in association with much newer rocks, referable to the Mesozoic and Tertiary periods. Though in the western portion of the continent rocks of Carboniferous age exist, so far as yet known they are never coal bearing. In British Columbia, the formations known to contain coal or lignites, are (1) the Cretaceous, (2) the Tertiary. The coal occurs in at least two distinct stages of the Cretaceous. The lower includes the coal measures of Queen Charlotte islands, of Quatsino sound, Vancouver Island and of Crowsnest pass in the Rocky mountains. The upper includes the coal measures of Nanaimo and Comox and, probably also those of Suquash and other localities. The fuels of the Tertiary rocks are, generally speaking, lignites, but include also various fuels intermediate between these and true coals, which in a few places become true bituminous coals.

The series of mineral fuels represented in British Columbia range from anthracites, that compare favourably with those of Pennsylvania and

Wales, to lignites, in which the original woody structure is still clearly preserved. The character of the coals, while dependent to a certain extent upon its stratigraphical position, depends largely upon the conditions of metamorphism to which they, with the rocks containing them, have been subjected. This is well illustrated by the Tertiary coal in the interior basins of British Columbia being highly bituminous instead of lignitic, while on Queen Charlotte island the Cretaceous coals range from high grade bituminous to broken and shattered anthracite.

The production of coal in British Columbia for the year 1909, was 2,606,127 tons representing nearly twenty-five per cent. of the total production of Canada for that year. The coal fields of British Columbia may, for convenience, be divided as follows:

(1) Eastern Rocky Mountain area.
(2) Southern Interior basin.
(3) Northern Interior basin.
(4) Coast district.

The Eastern Rocky Mountain area, on the Elk river is divided into two portions.[a] The southern one—for which Fernie is the largest shipping point—has a length, north and south, of about thirty miles, and a maximum width of twelve or thirteen miles, with an estimated area of 230 square miles. The coal-bearing rocks have in several sections been found to have a thickness as great as 4,700 feet. In this area there are twenty-two workable seams, with a total of 216 feet of coal. Of this thickness of coal, 198 feet occur in a thickness of 1,847 feet of strata, and of this coal, making allowances for shale partings and impurities, it is estimated that 100 feet are available for mining. This would give a total workable coal content for the district of 22,600,000,000 tons. The coal is a high grade bituminous occasionally running into anthracitic. The majority of the seams are suitable for the manufacture of coke, but steam coal is also produced. The collieries are situated at Coal Creek, (near Fernie) Michel, Morrissey and Hosmer. The northern portion of this coal-field extends from about twenty-four miles north of Michel creek to the sources of the Kananaskis river, a distance of nearly forty miles. The maximum width does not exceed seven miles, and towards the north diminishes to the vanishing point at the source of the Kananaskis. This area is about 140 square miles in extent and has been estimated to contain 14,000,000,000 tons of coal.

The gross output of the collieries of the Eastern Rocky Mountain area (East Kootenay district) for the year 1909, was 1,034,728 tons, representing about 38.4 per cent. of the total coal production for British

[a] Summary Report, Geological Survey, 1900, 1901, and 1905.

Columbia during that year.[a] By far the greatest portion of coal mined in this district is produced by the Crows Nest Pass Coal Co., operating collieries at Michel, Coal Creek (Fernie) and Carbonado, the united gross output of which, in 1909, was 899,043 tons. Of this, 370,811 tons were used in making coke. The resulting coke amounted to 250,255 tons. Hosmer mines produced 67,662 tons of coal and 24,164 tons of coke. The Corbin Coal Co. produced 68,122 tons of coal and no coke.

In the Southern Interior area, coal is found in the Nicola valley and along the Tulameen and Similkameen rivers. According to Dr. R. W. Ells[b] the productive coal areas of the Nicola coal basin may be arranged roughly into four groups, viz:

(1) That of the Lower Nicola or Ten-mile Creek basin, about three miles below Coutlee.

(2) That of the Coal gully, containing several seams, one of which has been opened up and mined locally for some years.

(3) The Coldwater seams about a mile and a half to the east, where one seam is exposed in two outcrops on the bank of the stream at an interval between the two exposures of nearly one-fourth of a mile. These two are sometimes known as the Garesche-Green area.

(4) The Quilchena basin, which is entirely separated from the others, and distant about ten miles to the east.

The Nicola basin includes an area of about 55 square miles and is surrounded by volcanic rocks. The coal, bituminous, is Tertiary in age and makes an excellent coke. The Nicola Valley Coal & Coke Co. mined about 69,675 tons in 1909.

To the south of this basin are the coal areas found along the Tulameen and Similkameen rivers, about fifty miles distant. The lignite-bearing rocks of this basin cover an area of 45 square miles, and contain high-grade coking coals.

On the west coast, it occurs on Graham island and along the east coast of Vancouver island.

The coal-bearing rocks of Queen Charlotte island extend over portions of Graham and Moresby islands, on both sides of Skidegate inlet, and run across Graham island to Masset inlet. These rocks cover an area of about 200 square miles. At Cowgitz, in Skidegate inlet, anthracite coal occurs, while on the Yakoun river, midway between Skidegate and the head of Masset inlet, a seam of bituminous coal 18 feet in thickness has been found. Along the east coast of Graham island, lignite occurs in a number of places in the Tertiary sediments.

In the northern portion of Vancouver island Cretaceous coal-bearing

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[a] Report of the Minister of Mines of British Columbia, 1909.

[b] Report of Geol. Survey, Vol. XVI.

rocks occur at Forward inlet, Koprino and Koskimo, all on the shores of Quatsino sound, and at Malcolm island and Suquash, on the north-east coast of the island. The coal is bituminous and of good quality.

The Nanaimo and Comox coal-fields are the most important in British Columbia, and produced 1,653,943 tons of coal in 1909, more than sixty per cent. of the total coal output of British Columbia for that year. The Cretaceous rocks constituting these coal fields border the south-western side of the strait of Georgia, forming a belt of comparatively low rolling or hilly country between the mountainous region of the interior of Vancouver island and the coast.

The productive measures of the Comox field underlie an area of about 300 square miles. The total thickness of workable coal is a little over 25 feet. The coal is a very good variety of bituminous, low in ash and some seams yield coal which makes a very strong coke. The principal company operating in this area is the Wellington Colliery Co. The area of the Nanaimo coal-field is estimated at about 200 square miles. Near Nanaimo, coal has been mined since 1852. The principal companies operating in this area are the Western Fuel Co. and the Wellington Colliery Co.

Extensive coal deposits have been discovered in the northern interior of British Columbia; but their size and content have not yet been definitely ascertained. Successful prospecting has been carried on in the Telkwa and Bulkley valleys, near the line of the Grand Trunk Pacific railway.

ALBERTA, MANITOBA AND SASKATCHEWAN.—The following is quoted from D. B. Dowling's report:

> "In Manitoba, the coal-bearing rocks occupy a small area in the southern part, underlying an elevated portion called Turtle mountain. The seams outcrop around the base of this hill, and it is probable that others will be found higher up its slopes. With our present knowledge we can define an area of about forty-eight square miles near the western end of this hill as being available for mining.
>
> "The Saskatchewan areas lie principally in the southern part, and are being mined on the Souris river. The elevation known as the Coteau is also composed of coal-bearing rocks, which continue westward in the Wood mountains and the Cypress hills. This area, although not well prospected, contains possibly 4,000 square miles within which coal may be found. Between the two branches of the Saskatchewan river there is an area of possible coal-bearing rocks; but the horizons having good workable seams farther west appear, in this area, to be rather poorly supplied, so that the value of this portion as a coal-field is problematical.
>
> "The Province of Alberta, as will be seen from the accompanying map, is liberally supplied with coal areas. The western border of the southern part of the Province consists of several ranges of mountains, formed generally of rocks which were originally the floor on which the coal formations were laid down. The elevation of the coal formations subjected them to greater denudation than the

harder rocks beneath, consequently little of this material is left; but in the wider valleys remnants are still found. These, from the superior quality and amount of coal, form very valuable coalfields. The foothill belt, although not well prospected, will be found to contain many valuable areas in which a softer grade of coal may be found.

"East of the foothill area lies a great extent of coal-bearing rocks which are comparatively undisturbed. The coal in this region is well suited for domestic use; and as it is within the settlement belt, where wood is scarce, a demand for it is assured. These areas are delineated on the map, and may be referred to as the Edmonton coals. They extend north from near the International boundary to near the Peace river, covering an area of at least 10,000 square miles.

"Another coal formation occupies the south-eastern border of the Province, with an area of 5,000 square miles; the seams in this are of more value in the southern portion than farther north or east. The principal mines of this area are to be found near Lethbridge."

The coal is found in three distinct horizons in the Cretaceous, separated by shales of marine origin. The three coal horizons are as follows:

(1) Edmonton formation in Alberta, and Laramie in Saskatchewan.

(2) Belly River (Judith River) formation.

(3) Kootanie formation.

The following table gives an estimate of the total coal:

ESTIMATE OF TOTAL CONTENT OF COAL AREAS [a]

	Area (in sq.miles)	Millions (Tons)	
Alberta:			
Coleman area	45	2,000	Bituminous
Blairmore-Frank	50	1,500	"
Livingstone	60	1,500	"
Moose Mountain	15	250	"
Cascade	40	1,200	Bituminous and Anthracitic
do		400	Anthracite
Palliser	6	20	Bituminous
Costigan	12	60	"
Bighorn	60	1,400	"
Belly River areas	3,500	10,000	Lignitic and Lignite
Foothills	2,000	11,000	Coal and Lignitic
Edmonton formation	10,800	60,000	Lignite
Total, Alberta	16,588	89,330	
Saskatchewan:			
Laramie	4,000	15,000	Lignite.
Belly River	1,500	3,000	"
Total Saskatchewan	5,500	18,000	Lignite
Manitoba:			
Turtle Mountain	48	160	Lignite

The total estimate for these three provinces approximates 22,136 square miles, and 107,000,000 tons of coal.

[a] *Coal fields of Manitoba, etc.*, D. B. Dowling, Geological Survey of Canada.

The coal industry of Alberta and Saskatchewan has developed at a very rapid rate. In 1900, these two provinces were only contributing a little over six per cent., whereas in 1909 their aggregate production represents over twenty-two per cent. of the total production of Canada. The coal production of Saskatchewan increased from 200 tons in 1890 to over 192,000 tons in 1910. In 1910, the coal production of Alberta was 2,824,929 tons, an increase of over 41.6 per cent. over 1909. Since 1905, Alberta's output has multiplied by three. The quantities of lignite, bituminous and anthracite mined during the year 1909, were respectively 763,673 tons, 1,197,399 tons and 213,257 tons. The production of coke was 87,812 tons, and the production of briquettes, 89,785 tons. A noteworthy feature of the coal industry of Alberta is that only about six per cent. of the production is exported, so that ninety-four per cent. of the coal mined in the Province is consumed in Canada.

YUKON.—In the Yukon district, coal has been found at several places. Among other localities, the Klondike river shows Tertiary coal-bearing rocks for a distance of about sixty miles. Lignite coal outcrops on Rock and Coal creeks, and on Cliff, Twelve-mile and Fifteen-mile creeks, the area underlain by the coal is estimated at 200 square miles. In 1909, coal was mined in Yukon in two fields, viz., in the Tantalus field on the Lewes river in southern Yukon, and on Coal creek, a small tributary of the Yukon, which joins the latter fifty-eight miles below Dawson. The Tantalus field is the most important, as coal of a bituminous character exists there in large quantities, whereas the product of the other field is lignitic in character.

In 1909 the production was 7,364 tons.

CONSUMPTION.

In 1910, the total consumption of coal in Canada amounted to 21,017,445 tons, made up as follows: 10,419,463 tons of coal produced in Canada, and 10,597,982 tons of imported coal. According to these figures, Canada produces only 49.5 per cent. of the coal which it consumes. It must be noted, however, that if all the coal mined in Canada had been used in the country, it would have constituted over 60.8 per cent. of the consumption.

The consumption of coal in Canada has increased from 3,480,111 tons in 1886 to 18,625,202 tons in 1909. During the same period the coal conusmption per capita has increased from 0.758 tons to 2.660 tons. The following tables give the distribution of coal sold:

BRITISH COLUMBIA COAL SALES [a]

Markets	Tons, 2,240 lbs.		
	1907	1908	1909
Sold for consumption in Canada	916,262	918,872	998,494
Sold for export to United States	651,076	567,274	678,137
Sold for export to other countries	22,038	29,883	63,509

NOVA SCOTIA COAL SALES

Markets	Tons, 2,000 lbs.		
	1907[b]	1908	1909
Sold for consumption in Canada	4,543,427	5,120,562	4,368,387
Sold for export to United States	690,269	559,592	359,224
Sold for export to other countries	178,063	247,146	187,307

Waste attending Coal Mining Operations.—In the mining of bituous coal, it is estimated that for every ton of coal produced for market, one half a ton is lost or wasted. In the mining of thick beds, the recovery probably does not exceed thirty per cent.[c] Up to the present time there has been no means of collecting this data. Nova Scotia has taken the first step to obtain it, and, in order to further the work of conserving our fuel supply, it is necessary that the other provinces follow her example. The following is a reproduction of the "Coal Depletion Statement" issued by the Nova Scotia Department of Mines:

Coal Depletion Statement

.....Company,.....Year. .

.....

ITEMS	QUANTITY
Average thickness of Coal Seam in feet	
Angle of dip.....	
Area worked over during year.....	
Total quantity, by calculation in tons, in area worked over during year	
Quantity extracted in tons from Area worked over during year.....	

a B. C. Dept. of Mines.
b Fiscal year ending Sept. 30.
c *Coal fields of the United States*, by Parker, Bulletin No. 14, State Geological Survey, Illinois.

ITEMS	QUANTITY
Percentage of quantity extracted from Area worked over during year	
Quantity, in tons, remaining in Area worked over during year	
Quantity, in tons, recoverable from Area worked over during year	
Percentage loss or not recoverable from Area worked over during year	
Total area in acres worked over in the Colliery at close of 1906	
Total area in acres worked over in the Colliery at close of 1910	

Name or No. of Colliery.....
Name of Coal Seam.....
System of working.....
Total area proposed to be worked from.....Colliery..
Remarks.....

To this statement, under "system of working," the size of pillar, thickness of cover over the coal, and nature of floor and roof should also be added. The item "Percentage loss or not recoverable," should also be divided into two distinct items.

The wastes attending coal-mining operations may be enumerated as follows:

(1) Coal lost beyond recovery by mining the lowest seams first.
(2) The coal left in as pillars to support the roof.
(3) The low-grade coal left in the mine.
(4) Slack coal formed during mining operations.

(1) In Western Canada, where there are so many seams of great thickness close together, it is of the utmost importance that attention be given to the mining of the upper seams first (where it can be done at a profit) so that any caving that may take place, upon the withdrawal of the pillars, will not render it impossible to recover the coal contained in the lower seams.

(2) The coal left in as pillars to support the roof may be considered a necessary loss but the present tendency is to extract too high a percentage of coal at first and to leave too weak a pillar to support the roof. The work of robbing such a pillar is extremely dangerous. Where conditions are favourable, the longwall system could be used to great advantage and the percentage of coal left in the mine would then be practically *nil*. This system has been used in the West and was found to be most efficient as

regards safety and percentage of coal recovered, but was abandoned on account of, it is understood, the high cost of mining.

(3) The coal which is left in the mine because of its inferior quality cannot be considered as unavoidable waste, and is frequently of higher grade than coals mined and used in other portions of the country. The internal combustion engine and the gas producer have been developed to such an extent that very low-grade coals may be utilized in connection with them to generate power.

(4) The excessive slack coal produced during mining operations not only represents a loss of good coal but is also a menace to the safety of the mine itself. Recent research has proven that coal dust is a very explosive substance and that it will explode under some circumstances, both in the presence of fire damp and without it. Mining coal by "shooting off the solid" produces more slack coal than any other system and the longwall system produces least.

Much slack coal is thrown away each year. A large part of this waste could be prevented by briquetting. The briquetting of coal adds to the cost from $1.00 to $1.56 per ton over and above the cost of the coal mined; but, even at this greater price, briquettes are desirable. The binder (tar) costs from 56c to 70c per ton but this price may be reduced if coke is made at the mine and by-product ovens used, recovering the tar for use as the binder.

Their advantages are:

1. One pound of briquettes burned under a boiler will generate more steam than one pound of coal.
2. They stand transportation well.
3. They are made from what would otherwise be waste slack.
4. They make a clean fuel of very convenient size for household use.
5. The density of the smoke with the briquetted coal is much less than with the natural coal.
6. Briquettes withstand exposure to the weather and suffer little deterioration from handling.

The following is an extract from the Transactions of the American Society of Mining Engineers, June, 1910:

> "The most important problem which we have yet to solve in connection with the commercial briquette plants is the binder. This is by far the largest single item of cost in the briquetting of coal, and the success or the failure of a plant may depend, first, upon the cost of binder, and second, upon its uniform quality. In Europe the briquetting of coal has been developed through many years along with other means of utilizing fine or waste coal. This is notably true of the by-product coke-oven. There the briquette industry consumes a large portion of the tar recovered in these ovens. As the consumption of this tar represents an important item in the commercial success of this form of coke-ovens, and the briquette industry

consumes the major portion of the tar so produced, the requirements for briquetting-pitch have been met by the producers of by-product coke. The two industries must of necessity work hand in hand. I cite the coke-oven industry because this is the largest producer of tar, the pitch of which is used mainly for briquetting purposes."

The production of briquettes in Great Britain amounts to 2,000,000 long tons, equivalent to one-fifth the total coal production in Canada.

As thirty per cent. of the output of the Bankhead colliery, near Banff, Alta., is slack coal too small to be sold for steam or fuel purposes, the management have installed a plant for making briquettes. This is, so far as can be ascertained, the only briquetting plant in operation in Canada, and is the largest in North America.

WASTE SUBSEQUENT TO MINING—In the manufacture of coke, enormous waste results from beehive oven practice. In the beehive oven the volatile combustible contents are consumed and all the valuable constituents of the coal, except fixed carbon, which is left behind as coke, are wasted. These wasted constituents consist of gas, tar and ammonia. In what are known as by-product ovens, however, the process is one of distillation and the tar, ammonia and all of the gas, except that used for heating the ovens, are recovered.

In Germany, at the present time, little or no coke is made except in retort ovens. In the United States, in 1907, there were 3,892 retort ovens, while the number of beehive ovens in operation in that year was 94,746. The production from the retort ovens was 5,607,899 short tons of coke and that from beehive ovens 35,171,665. The total value of by-products obtained in the manufacture of the coke by means of the retort ovens was $7,548,071; and the total loss, due to the use of beehive ovens was about $38,000,000, less the difference of operating expenses, wear and tear, etc.

The total production of oven coke in Canada for the year 1909 was 875,080 short tons[a], valued at $3,557,147. The total number of ovens was 2,737; of these, 150 were retort ovens, saving the gas; 500 Otto Hoffman retort ovens, saving tar and ammonia; and the remainder, 2,087, were beehive ovens—wasting the gas, tar and ammonia.

Great losses also occur when coal is improperly burned or when the coal has a high percentage of ash. The loss in smoke alone, if bituminous coal is burned in the average furnace, has been estimated at about ten per cent. Hence, anti-smoke laws should be encouraged, as they tend to conserve the fuel. Experiments have shown that when the coal contains about forty per cent. of ash, the remaining sixty per cent of dry coal can be burned without producing any useful effect.[b] These two conditions are caused first, by improperly constructed furnaces; second, by careless mining methods.

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[a] Department of Mines of Canada.

[b] A paper by W. T. Abbott, Journal of the Western Society of Engineers, Vol. XI.

Peat

In the days of the early settlement of Canada, the country was heavily covered with forests, and wood for fuel and other purposes was abundant and cheap. As the country became more thickly populated, the forests gave place to farms, and new and increasing demands arose for all kinds of wood. The importance of wood as fuel among the farming classes of Canada is well shown from the following figures for 1910, which the Commission of Conservation secured by means of an Agricultural Survey[a] of one hundred or more representative farms in each of the provinces in the Dominion.

FUELS USED ON CANADIAN FARMS

Province	Percentage of Fuel Used		
	Wood	Coal	Wood and Coal
Prince Edward Island	60	6	34
Nova Scotia	92	..	..
New Brunswick	100	..	..
Quebec	91	..	10
Manitoba	33	..	63
Saskatchewan	..	..	75
Alberta	..	100	..
British Columbia	85	..	..

In many parts of Canada coal has not yet replaced wood as a fuel. As the coal deposits of Canada are found only in the eastern and western portions of the country, it is, therefore, necessary for Ontario, Quebec and Manitoba to import coal from the United States. In Ontario and Quebec, anthracite coal costs $7.50 per ton; in Manitoba, the cost is as high as $10.

During the strike of the coal miners of the anthracite region in the United States in 1902-3, these provinces were brought face to face with the fact that they were almost entirely dependent on the miners of the United States for their fuel supply. Anthracite coal in Ottawa at that time was sold at $12 per ton. For these reasons, a satisfactory commercial substitute for coal would find a ready market. The necessity of utilizing the peat deposits scattered throughout the more settled portions of Ontario and Quebec has, within recent years, been appreciated, and efforts have been made to establish a peat industry. Much money, thought and energy have been spent on this problem, but the plants erected have, in many cases, failed to produce a suitable economic fuel. Unlike coal and other fuels on the market, peat requires special treatment, including drying, before it can be used as a fuel. When it comes from the bog it contains from 85 to 95 per cent. of water; in other

[a] For description of this Survey and a statement of the facts secured by means of it see p. 1.

words, a ton of wet peat rarely contains more than 300 pounds of dry peat. In the wet condition it is incombustible, and the various processes by which it is prepared for use or market consist principally in methods for removing the water quickly and cheaply, and making it better adapted for transportation. Concerning the failure to produce a peat industry in Canada, Dr. Haanel, in his presidential address before the American Peat Society, said:[a]

"Only in rare instances is progress made in improvement of processes of manufacture by those who are unfamiliar with what has already been achieved, and the causes which have led to failure. This may have been one of the reasons why the efforts so far made in utilizing our peat deposits have not been attended with success.

"To prevent further failure from this cause in the manufacture of peat fuel, an investigation was made by our Department three years ago and a report issued on the manufacture of peat for fuel and other purposes in the peat-using countries of Europe. This investigation has demonstrated that:

1st. For the economic production of fuel from peat, machinery driven by power must be substituted as far as possible for manual labor.

2nd. That processes so far invented for removing the water content of the peat by pressure and artificial heat have not led to commercial results, and, after trial, have been abandoned."

In order to stimulate the interest and enterprise of bog owners and manufacturers by demonstrating that peat can be produced cheaply as a fuel for domestic purposes or as a source of power for industrial purposes, the Dominion Government acquired about 300 acres of what is known as the Alfred bog, situated about 40 miles east of Ottawa. The peat in this bog varies in depth from 3 to 17 feet.

The following is an analysis of the peat:

ANALYSIS OF PEAT, ABSOLUTELY DRY

	PER CENT.
Volatile matter	68.23
Fixed carbon	26.00
Ash	5.77
Nitrogen	1.76
Sulphur	0.218
Phosphorus	0.033
Calorific value in British thermal units	9005.000

The plant at Alfred has a capacity of 30 tons of peat per day and the following is the cost of production:[b]

[a] Journal of the American Peat Society—Vol. 3, Nos. 3 and 4.

[b] Presidential address by Dr. Haanel, Meeting of American Peat Society at Ottawa, July 25th, 1910.

"Allowing 140 days for a season's operations, the cost per ton of air-dried machine peat, including interest on capital invested, amortization, oil and repairs is as follows:

Cost of fuel on field	$1.40
Cost of fuel stored in shed	1.65
Cost of fuel loaded on car	1.65
Cost of fuel in stack	1.70

By the employment of mechanical excavators and the manufacture of peat on a large scale, the cost of production per ton should be considerably less than the figures here given."

The peat is used at the fuel-testing station in a peat producer-gas plant of 60 H.P. capacity. The average effective value of the gas is about 126 B.T.U per cubic foot and it has been found that the producer requires from two and one-half to three pounds of peat per brake horse-power hour.

Using the figures given above it can be seen that one brake horse-power year (if generated at the bog) would cost from $18 to $21; and one electrical horse-power year could be produced for from $19 to $22.

Peat Resources of Canada

The following table, obtained from the bulletin on peat by Dr. R. Chalmers, of the Geological Survey, gives a summary of the peat areas in Canada and the average depth of the bogs. East of lake Superior the figures are at least approximately correct; west of that they are largely estimated.

CANADIAN PEAT DEPOSITS, BY PROVINCES

Province	Square miles	Average depth, in feet
Nova Scotia	250	8 to 10
Prince Edward Island	10	8 to 10
New Brunswick	250	8 to 10
Quebec (in settled portions)	500	8 to 10
Ontario { (in settled portions .....450) (Moose river basin, etc. ....10,000)	10,450	5 to 8
Manitoba	500	6 to 10
Alberta, Saskatchewan and N. W. Territories	25,000	5 to 10
British Columbia and Yukon	no data	.....
Total in round numbers	37,000	

Dr. Chalmers states that the above estimate is undoubtedly too low; nevertheless, it is evident that the bogs in Canada include an enormous area. Some idea of the immense amount of fuel contained in them may

be realized from the fact that a bog with an average depth of six feet, after drainage, contains about 774,400 tons of air-dried peat per square mile, equal in value to 430,244 tons of ordinary coal. In other words, a low estimate of the peat resources of Canada would be equivalent to nearly 16,000,000,000 tons of coal.

The following is a brief description of some of the peat bogs which have been surveyed by the Department of Mines.

MER-BLEUE PEAT BOG.—This bog is situated about eight miles from Ottawa, Ont. in the townships of Gloucester and Cumberland.

The total area covered by the bog is approximately 5,004 acres and the tonnage is estimated at over 5,000,000 tons (with 25 per cent. moisture)

The following is an analysis of the peat, absolutely dry:[a]

	1	2	3	4	5	6	7
Volatile matter	65.90	67.57	68.40	63.22	68.76	68.73	69.49
Fixed carbon	24.22	25.35	25.00	24.86	25.73	26.27	26.04
Ash	10.88	7.18	6.60	11.92	5.51	5.00	4.47
Phosphorus	.....	0.026	.....	.....	.....	0.024	.....
Sulphur	.....	0.314	.....	.....	.....	0.317	.....
Nitrogen	.....	1.40	.....	.....	.....	1.13	.....
Calorific value, B.-T.U., per lb.	8821	9021	.....	8805	9126	9441	9301

ALFRED PEAT BOG.—This bog is situated about 40 miles from Ottawa, in the townships of Alfred and Caledonia. It also extends into the township of Longueuil.

The total area covered by this bog is approximately 6,800 acres, and the tonnage of peat fuel available is estimated at about 9,500,000 tons (with 25 per cent. moisture).

The following is an analysis of the peat, absolutely dry:

	1	2
Volatile matter	68.13	68.72
Fixed carbon	26.56	24.22
Ash	5.31	7.06
Phosphorus	0.029	0.022
Sulphur	0.292	0.375
Nitrogen	1.23	1.92
Calorific value, B.T.U., per lb.	8730	9058.

[a]The columns numbered 1,2, 3 etc., in the table show the results of tests of various samples.

WELLAND PEAT BOG.—This bog is situated in the townships of Wainfleet and Humberstone, six miles north of the town of Welland, and between the Welland canal and its feeder.

The total area covered by this bog is approximately 4,900 acres, and the tonnage of peat fuel available is estimated at over 4,000,000 tons (with 25 per cent. moisture).

The following is an analysis of the peat, absolutely dry:

	1	2	3
Volatile matter	67.14	70.90	70.53
Fixed carbon	26.48	24.84	24.28
Ash	6.38	4.26	5.19
Phosphorus	0.027	0.024	.....
Sulphur	0.317	0.248	.....
Nitrogen	1.13	1.74	.....
Calorific value, B.T.U., per lb	9118	8596	8667

NEWINGTON PEAT BOG.—This bog is situated in the townships of Osnabruck, Roxborough and Cornwall, county of Stormont, on the New York and Ottawa railway, some forty miles from Ottawa, close to the village of Newington.

The total area covered by this bog is approximately 3,800 acres, and the tonnage of peat fuel available is estimated at over 6,000,000 tons (with 25 per cent. moisture).

The following is an analysis of the peat, absolutely dry:

	1	2	3	4	5	6	7
Volatile matter	66.75	67.07	68.84	71.32	69.54	65.77	66.97
Fixed Carbon	25.77	26.27	26.65	24.44	26.75	27.30	26.70
Ash	7.48	6.66	4.51	4.24	3.71	6.93	6.33
Phosphorus	0.028	0.030	.....	0.032	.....	.....	.....
Sulphur	0.530	0.494	.....	0.345	.....	.....	.....
Nitrogen	1.85	1.80	.....	1.63	.....	.....	.....
Calorific value, B. T.U., per.lb.	8721	8465	8877	8636	9102	8210	8312

PERTH PEAT BOG.—This bog is situated in the township of Drummond, about a mile and a half north of the town of Perth.

The total area covered by this bog is approximately 3,800 acres and the tonnage of peat fuel available is estimated at over 5,000,000 tons (with 25 per cent. moisture).

The following is an analysis of the peat, absolutely dry:

	1	2
Volatile matter	70.34	71.51
Fixed carbon	25.35	24.60
Ash	4.31	3.89
Phosphorous	0.030	0.027
Sulphur	0.405	0.334
Nitrogen	1.66	1.94
Calorific value, B.T.U., per lb.	9067	9148

VICTORIA ROAD PEAT BOG.—This bog is situated in the townships of Bexley and Carden, about one mile from Victoria Road station on the Midland division of the Grand Trunk railway.

The total area covered by this bog is about 67 acres, and the tonnage of peat fuel available is estimated at nearly 55,000 tons (with 25 per cent. moisture).

The following is an analysis of the peat, absolutely dry:

Volatile matter	69.52
Fixed carbon	25.18
Ash	5.30
Calorific value, B.T.U., per lb.	8649.00

USES OF PEAT

Under test conditions in Europe, in comparison with steam coal of good quality, one ton of peat fired under boilers has been found to be worth about five-ninths of a ton of coal. The peat makes a good fuel in the furnace which does not clinker or give off any volatile matter in the form of black smoke.

As a domestic fuel, peat is clean, easily handled and very efficient.

It has long been used in Northern Europe, where in the neighbourhood of 10,000,000 tons prepared in various ways, are consumed as fuel, annually.

Peat gas is used for metallurgical purposes, boiler firing, making lime and brick, and for generating electricity.

Besides being used as a fuel, peat is used for various other purposes. Moss litter is made from sphagnum peat, having a low degree of humification. It is used on account of its lightness and its absorbent qualities as a packing for fragile articles, and as a bedding material for stables. A moss litter with a 20 per cent. moisture content can absorb ten times its own weight of moisture. The litter is a poor conductor of heat and is used largely as a packing for steam pipes and boilers, and to

keep water pipes from freezing. Alcohol is manufactured from moss litter and has been made in Europe at a cost of 47c. per gallon.

Peat mull is a dry powder which is produced as a by-product in the manufacture of moss litter. It is an effective deodorizer and is largely used in Europe for sanitary purposes and as a filter for water. Fruit packed in boxes with peat mull is prevented from decaying for months.

A peat fuel plant equipped for making moss litter and peat mull has a decided advantage over a plant where fuel alone is made because in the winter and during wet weather when the peat cannot be properly air-dried, the by-products may be manufactured.

Petroleum

The production of crude petroleum comes almost entirely from the province of Ontario. The production of Canada in 1910, was made up of 314,410 barrels, or 11,004,350 gallons from Ontario and 1,485 barrels from New Brunswick. The following table gives the production of oil in Canada since 1901, in barrels of 35 gallons, together with the total value, and average price per barrel:

PRODUCTION OF CRUDE PETROLEUM IN CANADA, 1901-1910

Year	Barrels of 35 gallons	Value	Average price per barrel
1901	622,392	$1,008,275	$1·620
1902	530,624	951,190	1·792
1903	486,637	1,048,974	2·155
1904	503,474	935,895	1·858
1905	634,095	856,028	1·350
1906	569,753	761,760	1·337
1907	788,872	1,057,088	1·340
1908	527,987	747,102	1·415
1909	420,755	559,604	1·329
1910	315,895	388,550	1·230

Petroleum Resources of Canada

Ontario

Lambton Petroleum Fields.—The principal petroleum fields in Ontario, are found in Lambton county. Oil was first found in this county in 1862, and some of the wells remained active producers for over forty years. The oil-fields are situated at Petrolia, Oil Springs and Moore. These fields are all situated within an area underlain by Devonian strata and, usually, on an anticlinal axis. The petroleum is largely obtained from horizons in the Onondaga (Corniferous) at varying depths in the different localities. At Petrolia, the oil-bearing horizon is usually between

450 feet and 480 feet beneath the surface. The production of petroleum from Lambton county has decreased from 811,781 barrels in 1890 to 205,456 in 1910, or over 75 per cent. in twenty years. The reduction has been brought about not by the sudden cessation of oil in any particular portion or portions of the field, but by a gradual diminution of the yield per well. In fact, the oil-producing territory of Ontario is unique in the small individual production of its wells, and in the tenacity with which it is worked.

TILBURY AND ROMNEY OIL-FIELDS.—The Tilbury and Romney oil-fields lie between lake St. Clair on the northwest and lake Erie on the south-east, and derive their names from the townships in which they occur. Oil was first found in the Tilbury field in December, 1905, at a depth of 1,430 feet. The field has a length of about eight and a half miles and an average width of about three miles. The Romney field lies in the northern portion of the township of Romney, and the adjoining portion of East Tilbury. This territory is sometimes referred to as the 'shallow pool,' the oil being struck at less than 300 feet. The production of Tilbury and Romney fields since 1905 is as follows:

	Barrels
1906 [a]	106,992
1907	411,588
1908	201,283
1909	124,003
1910	63,058

It will be noticed that, while the production in 1907 was large, there has been a rapid decrease in the flow of this field—about 50 per cent. in each year since 1907.

BOTHWELL OIL FIELD.—The Bothwell field is situated in the northern portion of Zone township between the Grand Trunk railway and the Thames river, about two and one-half miles west of the village of Bothwell. The oil is found in the Corniferous at a depth of about 600 feet. The following figures show that this field has been a fairly steady producer since 1905:

	Barrels
1906	44,827
1907	42,727
1908	39,228
1909	38,092
1910	36,998

[a] First year of production.

LEAMINGTON FIELD.—Oil was found near Leamington, Essex county, in 1902. The productive area extends from concessions I to IX in the township of Mersea, and has a width of about 1,000 feet. The oil 'pool' was found in the Guelph at a depth of 1,075 feet. The following figures show that the production has fallen off very rapidly:

	Barrels
1906	39,652
1907	16,133
1908	9,334
1909	5,929
1910	141

DUTTON FIELD.—This field is situated about five miles south of the village of that name, and comprises in all about 400 acres. The oil is found in the Corniferous at a depth in it of 160 to 175 feet. The best wells are obtained when the Corniferous is struck 245 to 250 feet from the surface. The following figures show that the production of oil in this field has decreased over 60 per cent. since 1906:

	Barrels
1906	19,376
1907	14,977
1908	13,743
1909	9,513
1910	7,725

From the foregoing it can be seen that there has been a diminution in the output of every one of the fields; but the rate of decline in the newer districts of Tilbury, Romney and Leamington has been greater than in the older districts. The present production is about one-half of what it was in 1901, and, if the falling off continues, the supply of domestic petroleum will tend to become relatively insignificant unless new reservoirs are opened up.

NEW BRUNSWICK

The oil production of New Brunswick increased from 95 barrels in 1909 to 1,485 barrels in 1910. This increase was due to the extensive development work done by the Maritime Oil-Fields Ltd. The following description of this oil-field is taken from the report of the second annual meeting of Maritime Oil-Fields Ltd., given in the Canadian Mining Journal:[a]

MARITIME OIL-FIELDS, LTD.—"The company had now 13 productive gas and oil wells, yielding a total measured flow of 37,500,000

[a] Issue of May 15, 1911, page 310.

cubic feet of gas per day and a considerable flow of oil, which latter is impossible of measurement owing to the necessity of shutting in the wells under the great gas pressure existing (as high as 600 pounds per square inch), but in certain wells which it was possible to 'shoot,' initial oil flows ranged up to 60 barrels per day. The development work on the Stony Creek "gas and oil pool" had now thoroughly proved a length along the anticlinal of over one and a half miles and a breadth of over half a mile. The successive wells westward have proved to be increasingly valuable, and the geological conditions continue favourable. In accordance with the best natural gas practice, the company has sunk only one well per 30 to 40 acres. As the greatest portion of the area developed is oil-bearing also, and as oil-well practice calls for one well per 5 acres or less, there is room for over 100 additional oil wells to be sunk on the area already developed when the time comes to treat this as an oil-field. The Albert county anticlinals had been traced over 40 miles west, where natural gas springs occur, and there were thus great possibilities in this southern section of the Company's area. The three groups of productive oil and gas sands tested at Stony creek had proved persistent in character and extent as gas and oil-bearing. Each group contained up to six distinct sands—individual sands varying from 2 feet to 100 feet in thickness—and the maximum aggregate thickness of sands in any one well exceeded 250 feet. A still deeper group of oil sands as yet untested at Stony creek was known to exist, whilst the total thickness of the oil-bearing formation is still unknown, but has been proved to exceed 3,000 feet.

Among other resources of oil in this province are the Albert shales and the associated mineral albertite. The Albert shales, which cover large areas in Kings, Albert and Westmorland counties, have a thickness of about 1,000 feet and contain inter-stratified beds of oil shales. In 1908, the Albertite, Oilite and Cannel Coal Co., Ltd. of New York, took up the question of distillation of oil from the Albert shales, and 45 tons of the oil-shales were sent to Scotland for the purpose of making a commercial test in the works of the Pumpherston Oil Co. The results obtained were very satisfactory as the average yield per ton of shale was 40.09 gallons of crude oil, and 76.94 pounds of sulphate of ammonia.[a] This compares very favourably with the shales which are worked so extensively in Scotland, the yield of which rarely exceeds 25 to 30 gallons of crude oil."

Imports

While the production has been decreasing, the imports, as might be expected, have been increasing. The total imports of petroleum oils, crude and refined, have increased from 687,641 gallons in 1880 to 67,949,643 gallons in 1910. The oil imports include crude oil, 53,604,053 gallons; refined and illuminating oils, 7,656,727 gallons; lubricating oils, 3,071,257 gallons; other petroleum products, 2,607,606 gallons. In addition to the above, there were imported, 1,362,235 pounds of wax and candles, valued at $80,106.

[a] See reports on the Bituminous or Oil Shales of New Brunswick, No. 1107, Geological Survey, and No. 55, Mines Branch.

WASTE

The waste which occurs in oil production in Canada is not so much in the oil itself as in the natural gas incident to the oil production. The oil, if obtained, can be sold at once, whereas, to sell the gas, long, expensive pipe lines must be laid, franchises obtained from towns and cities, and then only a limited amount can be sold each year. Moreover, the great expense of a pipe line, increasing as the distance to which the gas is to be transported increases, prohibits marketing the gas beyond a certain limit. The individual interested in oil will undoubtedly, unless restrained, sacrifice the gas to secure a trifling amount of oil.

The following extract from the Chatham *News*, April 19th, 1910, illustrates the value of natural gas to the community:

> "The following is a copy of the resolution sent by the city clerks of Windsor and Chatham to the Minister of Mines—'That this council views with much concern any legislation or proceeding that would have the effect of making the production of natural gas secondary to the production of oil or that would permit of any waste of gas under cover of necessity or convenience in the production of oil.
>
> 'We are convinced that natural gas is the most important asset and its use is contributing now very materially to the progress and industrial development of this community. Its value as a product is out of all proportion to the value of the oil production. It is a most useful commodity and its use is most general among all classes of the community.'"

Natural Gas

The production of natural gas has increased in value from $150,000 in 1892 to about $1,300,000, in 1910. The producing gas wells are situated in the counties of Welland, Haldimand, Norfolk, Kent, Essex, and Bruce, in Ontario; at Moncton, New Brunswick; and at Medicine Hat and vicinity in Alberta. The quantity of gas sold or used during the year 1909 was over 7,000 million feet. Of the total value of the production, Ontario is credited with about ninety-five per cent.

WASTE.—Natural gas is a fuel which has many advantages. It is cheap, efficient and clean, self-transporting, and is an ideal fuel in every respect. Steps have been taken by the province of Ontario to check the waste of this valuable product. In 1907, an Act was passed which levied a tax of two cents per thousand feet on natural gas with a rebate of ninety per cent. when the gas is used in Canada. This provision has resulted in an almost entire stoppage of waste of gas in the gas-fields of Ontario.

In Alberta, on the other hand, no provision is made for the plugging of the gas wells, and, as a result, many millions of cubic feet of gas are wasted annually.

The following is an extract from the Engineering and Mining Journal, Jan. 2, 1909:

> "Alfred von Hammerstein, who has been carrying on extensive petroleum development in northern Alberta, calls attention to the enormous waste of natural gas which has been going on for many years in that region. Fifteen years ago, when drilling for oil was undertaken by the Canadian government at Pelican Portage, on the Athabaska river, a tremendous flow of gas was struck at a depth of 800 feet, which made it impossible to proceed with operations; the flow has continued ever since, the Government, in spite of the representations of those interested in the development of the district, having done nothing to stop it. An extended area is being drained."

In a gas field a careless driller may either lose control of the well through carelessness or ignorance, or abandon the same without plugging it. Not only is his own property destroyed, but the surrounding area is also drained, thus injuring the entire community through the acts of a single individual. His acts then become a matter of public concern and a proper field for legislative control.

A record of all the holes drilled in the West should also be filed with the government in order to protect future coal mining operations. If holes are drilled through the coal measures in order to reach the oil or gas zone below and, after finding natural gas, the casing is withdrawn and the well abandoned, these gas 'feeders' will be of great danger in future coal mining operations unless accurate records are kept. As an instance of this, two very serious mining accidents occurred in the United States last year through the workings breaking through into natural gas bore-holes.

The Ontario Act[a] to prevent the waste of natural gas in Ontario provides that:

> "1. Any person in possession, whether as owner, lessee, agent or manager of any well in which natural gas has been found, shall, unless such gas is utilized within two weeks from the completion of such well, in order to prevent such gas from wasting by escape, confine the same in such well until such time as said gas is utilized; but this section shall not apply to any well while it is being operated as an oil well.
>
> 2. Whenever the owner or any person in possession of or having the control of any well in which gas has been found, fails to comply with the provisions of section 1 hereof within the time therein mentioned, the inspector appointed, as hereinafter provided, shall notify such person in writing to cause such gas to be so confined, and in case of the failure of such person to comply with such notice within ten days from the receipt thereof, the inspector shall enter upon the lands upon which such well is situate and, either by himself, his agents or employees, shall cause such gas to be shut in and confined in such well.

[a] Statutes of Ontario, Chap. 47, 1907.

3. Whenever any well which has been drilled for the purpose of exploring for oil or gas is afterwards abandoned, it shall be the duty of the owner or the person in possession or control of such well, and of every person engaged or employed in removing the casing from or in plugging such well, or in any work constituting an abandonment of such well, to plug or plug and cement said well in such manner as to prevent any fresh or salt water or other injurious substances from entering the oil or gas-bearing rock, either from above or below such rock.

4. In every such case of abandonment, in addition to any other work necessary to the proper plugging of such well, in compliance with the provisions of the next preceding section or of any regulations made by an inspector in the manner hereinafter provided, there shall be inserted in such well a round and slightly tapering plug of seasoned wood not less than three feet in length and of such diameter as to enable it to be firmly driven and to fit tightly at the point where the casing used for the purpose of shutting off water from such well was made to rest.

5. Whenever any person notifies the inspector in writing that any property in which he is interested, situate in the vicinity of any such abandoned well, is injuriously affected by the failure to plug any such well, as in the next preceding section provided, the inspector shall examine such abandoned well and ascertain whether it has been properly plugged according to the provisions of this Act, and in case the inspector determines that such well has not been properly plugged, within the meaning of this Act, he shall serve a notice on the owner thereof or upon any person having the control thereof, or upon any person who was engaged or employed in the work of removing the casing from, or in plugging such well, or in any work which constituted an abandonment of such well, or may serve such notice on all of said persons, which notice shall require such well to be plugged within ten days from the receipt of such notice, and shall specify the method and manner to be followed in the plugging thereof, and unless within said ten days such well is plugged according to the directions contained in said notice, the inspector either by himself, his agents or employees, shall plug or cause such well to be plugged properly, according to the provisions of this Act.

6. The expenses incidental to or occasioned by the examination and plugging of any abandoned well, or by the confining and shutting in of the gas from any well by the inspector under the provisions of this Act, shall be paid to the inspector within ten days after notice in writing of the completion of the work and the amount of such expenses shall have been given to the owner or other person having control of any such well, and upon failure to pay the same within such time the inspector shall give written notice of such failure to pay to the clerk of the municipality in which such well is situate and of the amount payable, and the council of such municipality shall thereupon pay to the inspector such expenses, and the same shall be added to the taxes upon any property of the owner of such well, whether such well is situate upon such property or not, unless

the mineral rights in the land upon which such well is situate have been severed or reserved from such land, in which case the said expenses shall be added to any taxes chargeable against the reserved mineral rights in the land upon which such well is situate, or against any other property of the owner of such reserved mineral rights, and such expenses shall be placed upon the collector's roll of the municipality and may be levied and collected in the same manner as other taxes are levied and collected.

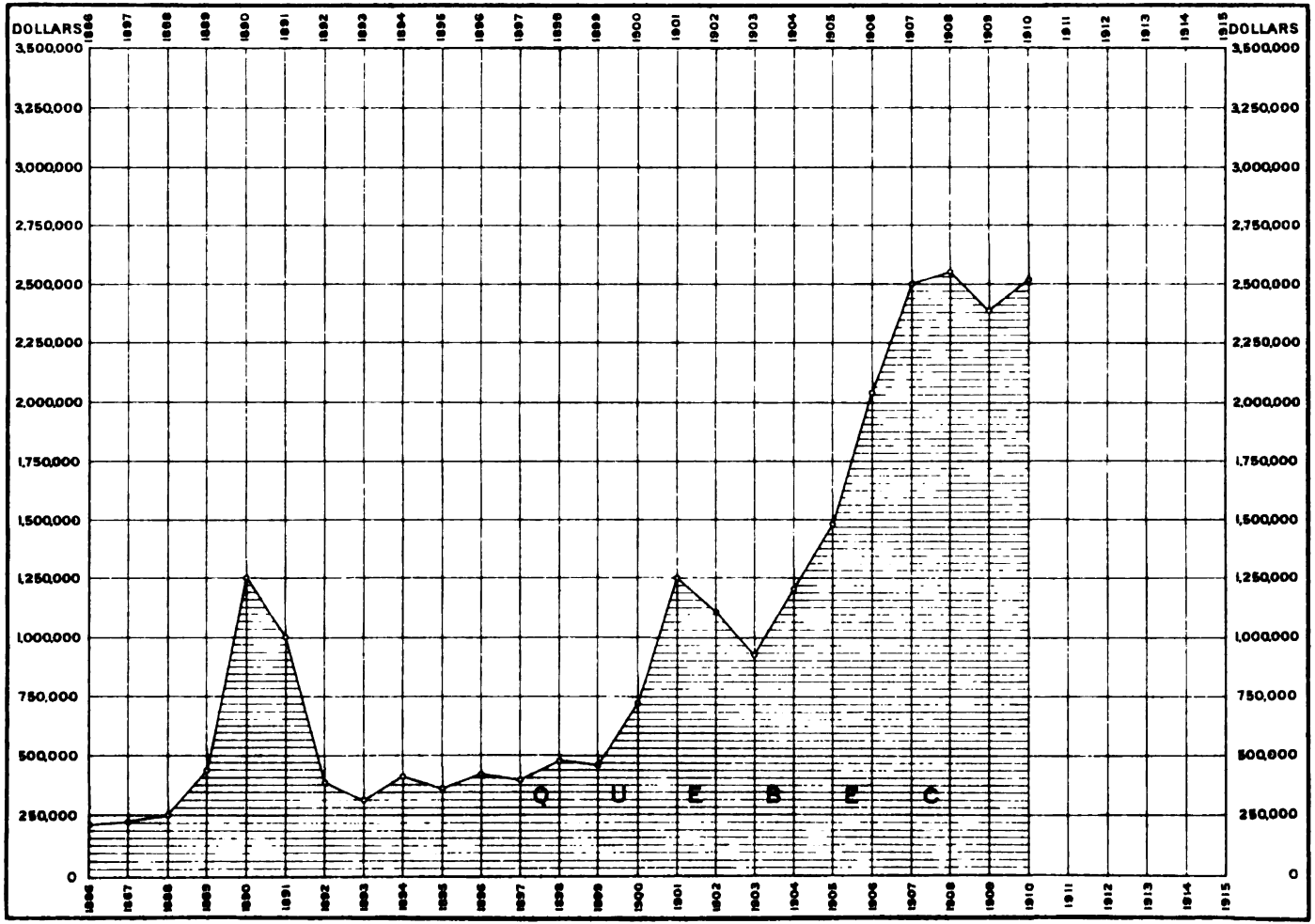
7. Any person found guilty of a violation of sections 1, 3, 4 or 11 of this Act shall, upon summary conviction, incur a penalty of not less than $10 and not more than $100 in addition to any costs and expenses which he may be liable to pay under the provisions of section 6 of this Act; but this section shall not affect any right of action for damages for injuries arising out of any matter or thing for which this section provides a penalty.

8. An inspector or inspectors may be appointed by the Lieutenant-Governor from time to time to enforce the provisions of this Act, and assigned to such district or districts as he may deem proper. Each inspector shall give such security as the Minister of Lands, Forests and Mines shal require for the performance of his duties and the payment over of all moneys received by him.

9. It shall be the duty of every such inspector to see that the provisions of this Act are complied with, to keep a record of all work done, notices given, proceedings taken and moneys received or paid out by him under the provisions of this Act. He shall have authority to engage such agents or employees as he may deem necessary from time to time to carry out the requirements of this Act, and shall also be empowered from time to time and at all times, by himself, his servants or employees, to enter upon any lands or property upon which any wells are being or have been drilled, and to make such examinations, inspection and inquiries as may be necessary for carrying into effect the provisions of this Act; and no action or other proceeding shall lie against any such inspector, his agents or employees for any matter or thing done by him or them under the provisions of this Act.

10. Whenever the conditions of any locality make it desirable in the opinion of the inspector, he may, subject to the sanction of the Minister of Lands, Forests and Mines, make special regulations respecting the manner of plugging abandoned wells in such locality in addition to or in substitution for the method directed to be followed in this Act. Such regulations may be made to apply to the whole or any portion of the district to which such inspector is assigned and may be promulgated in such manner as the said Minister shall direct, but shall not go into effect until after the lapse of six weeks from the first publication thereof.

11. The inspector may, by notice in writing delivered to any person who had charge or control of the removal of casing or plugging



ASBESTOS PRODUCTION OF CANADA (QUEBEC) FROM 1886 TO 1910

or abandonment of any well, or who was engaged or employed in removing the casing from or in plugging any such well, or in any work constituting an abandonment of such well, require such person within ten days from the receipt of such notice to furnish a statutory declaration respecting such abandoned well to said inspector; and such person shall within said ten days furnish said declaration to the inspector either by delivering the same into his hands or by mailing by registered post to his address; and such declaration shall identify such well and shall set out in detail the precise manner of and the material and tools used in plugging same; and any person violating the provisions of this section without sufficient cause or excuse shall incur the penalty provided by section 7 of this Act.

12. Chapters 276 and 277 of the Revised Statutes of Ontario, 1897, and amending Acts are hereby repealed."

In order to conserve the supply of natural gas, the gas must be utilized (1) for the purpose for which it is most valuable; (2) in the manner that will secure the greatest efficiency; and (3) as near as possible to the point of production.

The most valuable uses for natural gas are for domestic purposes and the development of power. It is estimated that, with gas at 12c. per thousand, electric power can be developed as cheaply as it can be generated by water-power at Niagara.

Experiment has shown that the amount of gas required per hour, for the development of one horse-power varies from 9 cu. ft. with the highest type of large internal combustion engine, to 130 cu. ft. with the ordinary steam engine. In other words, the efficiency of the gas is over fourteen times as great when used in gas-engines as when used for generating steam under the boiler.

Asbestos

PRODUCTION OF CANADA.—The value of the annual output of asbestos has increased from less than $25,000 in 1880 to over $2,555,000 in 1908, so that, next to coal, asbestos is now one of the most important non-metallic mineral products. In 1909, the production was $2,284,000, and in 1910, about $2,500,000. The diagram (Plate XIX) shows the asbestos production of Canada from 1886 to 1910. In 1909, the world's production of asbestos amounted to 82,788 tons. Of this tonnage Canada produced 63,349 tons or 76.5 per cent, Russia 14,654 tons or 17.7 per cent, South Africa 1,700 tons and the United States 3,085 tons.

The following table shows the value of the exports of Canadian asbestos, by countries, from 1905 to 1910.

VALUE OF EXPORTS OF CANADIAN ASBESTOS, BY COUNTRIES, 1906-1910

Country	1906	1907 (9 months)	1908	1909	1910
United Kingdom	$262,774	$292,620	$237,152	$233,653	$280,452
United States	1,036,648	759,907	1,323,070	1,294,977	1,505,477
Austria, Hungary	4,950	600	.....	.....	
Belgium	87,635	96,341	86,871	159,758	
France	49,620	32,416	50,612	57,640	94,619
Germany	111,617	20,065	8,195	10,057	15,925
Holland	.....	.....	.....	.....	}
Italy	23,993	3,751	21,678	1,379	}
Newfoundland	150	.....	.....	.....	}
Other countries	750	1,076	3,174	595	43,948
Totals	$1,578,137	$1,206,776	$1,730,752	$6,758,057	$2,108,632

Manufactures of asbestos imported into Canada are subject to a duty of twenty-five per cent. The following is the value of the imports from the United States, of asbestos in any form other than crude, and all manufactures thereof: 1905, $109,916; 1906, $122,691; 1907, (9 months) $113,158; 1908, $166,380; 1909, $161,964; 1910, $230,489.

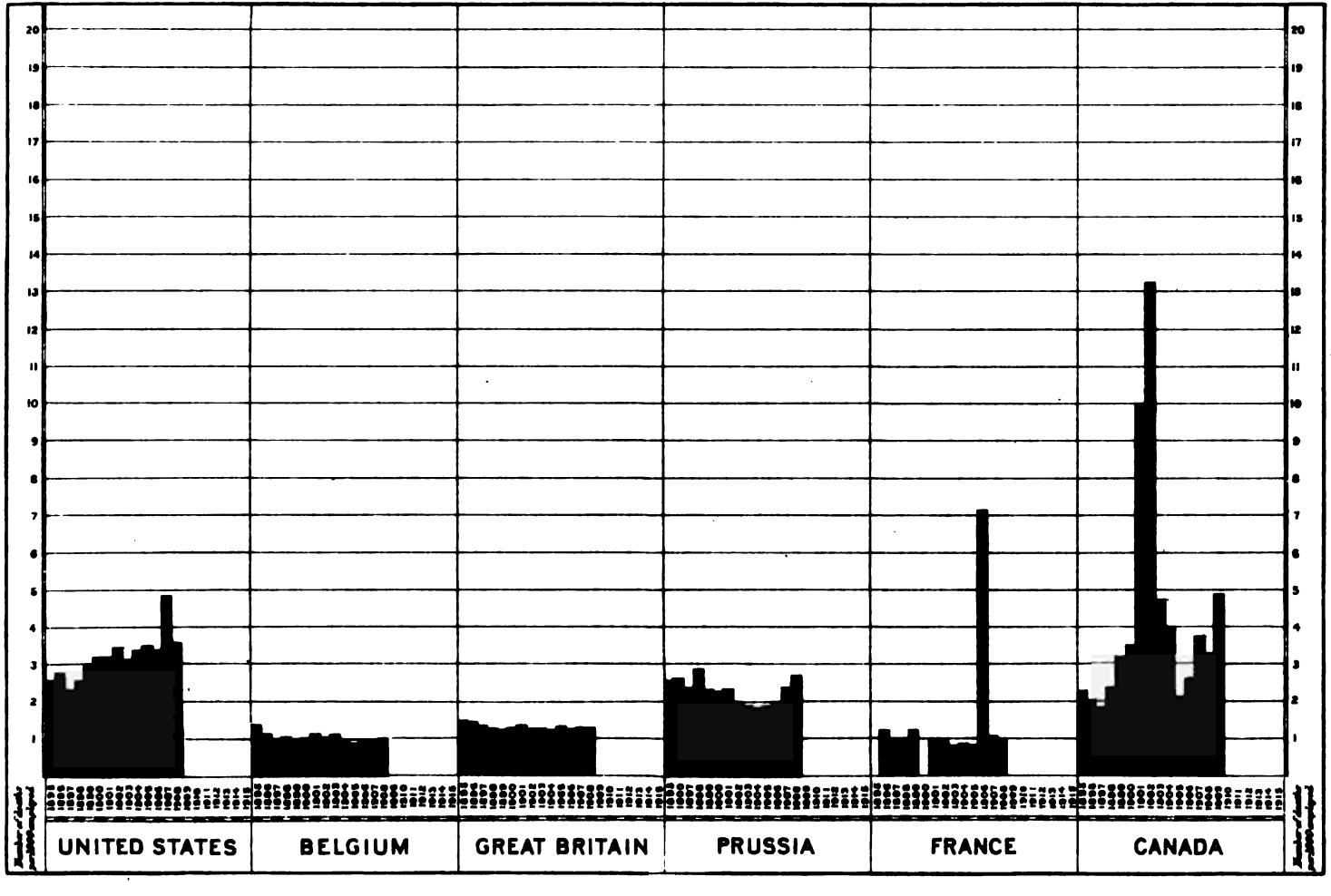
Resources of Canada.—The production of asbestos is derived altogether from the province of Quebec. It is mined at Black Lake, Thetford, East Broughton, and Danville. A small quantity of asbestos has been mined in Templeton and Denholm townships, Ottawa county, where it occurs in the Laurentian formation in close association with the crystalline limestone of the Grenville series. The fibre, as a rule, is short and, owing to the ore being found in "pockets" of small extent, it is not now being worked. A deposit of asbestos of not very great importance has also been found in the Chibougamau region in northern Quebec.

COMMISSION OF CONSERVATION

MINERALS. PLATE No. XX

COAL-MINE ACCIDENTS

Number of men killed for each thousand employed



MINE ACCIDENTS

Coal Mine Accidents

The following table gives the statistics from which the diagram (Plate XX) has been plotted.

TABLE I

TABLE SHOWING FATALITY RATE PER 1,000 EMPLOYED IN THE PRINCIPAL COAL PRODUCING COUNTRIES OF THE WORLD

Year	U. States	Belgium	Grt. Britain	Prussia	France	Canada [a]
1895	2.67	1.40	1.49	2.54	....	2.29
1896	2.79	1.16	1.48	2.58	....	2.05
1897	2.34	1.03	1.34	2.35	....	1.83
1898	2.59	1.04	1.28	2.86	....	2.40
1899	2.98	.97	1.26	2.31	1.35	3.19
1900	3.24	1.05	1.30	2.25	1.42	3.51
1901	3.24	1.16	1.36	2.34	1.03	9.96
1902	3.49	1.07	1.24	1.99	.95	13.25
1903	3.14	1.14	1.27	1.92	.86	4.75
1904	3.38	.93	1.24	1.80	.89	3.97
1905	3.53	.91	1.35	1.85	.84	2.10
1906	3.40	.94	1.29	1.94	7.17	2.59
1907	4.86	1.04	1.31	2.36	1.10	3.74
1908	3.80	1.07	1.32	2.61	.95	3.31

This diagram (Plate XX) shows that the death rates per 1,000 men employed in the coal mines of Canada and the United States are greater than in any other country in the world for which accurate statistics are available.

The diagram also shows that fatalities in the United States and Canada are on the increase, while Great Britain, Belgium, Prussia and France show a gradual decrease. We must interpret this in this way: (1) The danger inherent in the work can never be eliminated but could be brought down to a minimum, as indicated by the low, constant death rate in Belgium, Great Britain, and France (excepting the year 1906); (2) Coal mine explosions occur very frequently in Canada and the United States, while they are more infrequent in other countries. The causes for this loss of life are complex and neither the operators nor the miners willingly submit to them. It is not reasonable to expect that the loss of life and property can be entirely done away with; but at the same time, experience has abundantly proven that careful and impartial investigations of such conditions will point the way to the remedying of at least some of the abuses. In view of the importance of the subject to the country and the public at large, such studies should be undertaken.

[a] British Columbia and Nova Scotia.

TABLE II

SHOWING THE FATALITY RATE IN CANADIAN COAL MINES FROM 1900 TO 1909

Year	British Columbia			Nova Scotia			Alberta [a]			Canada
	No. of Men Employed	Fatal Accidents	Fatality Ratio per 1,000 Men Employed	No. of Men Employed	Fatal Accidents	Fatality Ratio per 1,000 Men Employed	No. of Men Employed	Fatal Accidents	Fatality Ratio per 1,000 Men Employed	Average Fatality Ratio per 1,000 Men Employed
1900	4,178	17	4.06	6,626	21	3.17	.....	.....	.....	3.51
1901	3,974	102	25.67	7,663	14	1.82	.....	.....	.....	9.96
1902	4,011	139	34.65	8,062	21	2.60	.....	.....	.....	13.25
1903	4,264	42	9.85	11,092	31	2.88	.....	.....	.....	4.75
1904	4,453	37	8.31	11,659	27	2.40	.....	.....	.....	3.97
1905	4,407	12	2.72	10,780	20	1.85	.....	.....	.....	2.10
1906	4,805	15	3.12	12,123	29	2.39	.....	.....	.....	2.59
1907	6,059	31	5.11	12,107	37	3.05	.....	.....	.....	3.74
1908	6,095	18	2.95	12,933	45	3.48	.....	.....	.....	3.31
1909	6,418	57	8.88	12,083	34	2.81	5,207	9	1.70	4.21
Totals and Averages	48,664	470	9.65	105,128	279	2.65	5,207	9	1.70	4.79

[a] Statistics for Alberta are available for 1909, only.

Belgium

The fatal accident rate in Belgian coal mines during the early fifties was as high as the Canadian death rate during 1905-08. The following figures are exceedingly significant:

"Between 1861 and 1870 the rate was 2.61 per 1,000, diminishing to 2.45 during 1871–80; to 1.99 during 1881–90; to 1.39 during 1891–1900. During the last eight years, the accident rate per 1,000 men employed has been 1.17 in 1901, 1.07 in 1902, 1.13 in 1903, 0.93 in 1904, 0.91 in 1905, 0.95 in 1906, 1.04 in 1907, and 1.07 in 1908. The rate in detail for each of the years forming the period 1850—1908 is given in Table No. III, furnished by the Royal Administration of Mines."[a]

TABLE III

FATAL ACCIDENTS IN BELGIAN COAL MINES, 1850—1908

(*Rates per* 1,000 *employed*)

1850 – 1869		1870 – 1889		1890 – 1908	
Year	Rate	Year	Rate	Year	Rate
1850	4.42	1870	2.25	1890	1.56
1851	2.61	1871	2.71	1891	1.40
1852	5.17	1872	3.17	1892	2.84
1853	2.86	1873	2.52	1893	1.12
1854	3.91	1874	2.30	1894	1.73
1855	3.55	1875	3.27	1895	1.40
1856	3.29	1876	1.82	1896	1.16
1857	2.71	1877	1.59	1897	1.03
1858	3.02	1878	2.08	1898	1.40
1859	2.81	1879	3.27	1899	0.97
1860	2.80	1880	2.73	1900	1.05
1861	2.56	1881	3.03	1901	1.16
1862	3.26	1882	2.09	1902	1.07
1863	2.89	1883	2.44	1903	1.13
1864	2.76	1884	2.26	1904	0.93
1865	3.53	1885	1.82	1905	0.91
1866	2.54	1886	1.33	1906	0.95
1867	2.53	1887	2.84	1907	1.04
1868	3.22	1888	1.75	1908	1.07
1869	2.71	1889	1.36		

"The decline in the fatality rate has extended to all of the principal causes, and considering only the four decades forming the forty-year period 1861–1900, the decline has been as follows: Falls of coal and roof caused a fatality rate of 8.98 per 10,000 employed during 1861–70, the rate declining to 7.08 during 1871–80, to 6.61 during 1881–90, and to 5.10 during 1891–1900. The fatality rate due to fire-damp declined from 3.44 during 1861–70, to 4.87 during 1871–80, to 3.64 during 1881–90, and to 2.55 during 1891–1900. Shaft accidents decreased from a fatality rate of 6.76 during 1861–70 to 5.56 during 1871–80, to 2.87 during 1881–90, and to 2.14 during

[a] F. L. Hoffman, *Coal Mining Fatalities in Belgium.* Engineering and Mining Journal, Sept. 10, 1910.

1891–1900. Miscellaneous accidents remained practically stationary during the first 30 years of the period; but the rate diminished from 6.87 during 1861–70 to 6.80 during 1881–90, to 4.12 during 1891–1900. There was a slight rise in the rate between 1871 and 1880, when it was 6.99. The decrease in the rate has continued, and during 1902 the rates were lower for the separate causes, or respectively, 4.30 for falls of coal and roof, 0.90 for fire-damp, 1.71 for shaft accidents, and 3.76 for miscellaneous accidents."

In commenting upon the decline in the fatality rate, the Belgian Government report states that:

"This constant improvement is the result of the combined efforts of the mine owners, the workmen, and the Administration of Mines; it is due, to a great extent, to diffusion of technical and professional education, to the keeping in force of the police regulations of 1884, and to the administrative organization of the scientific study of accidents."

It is observed, however, in this connection, that increase of security in firedamp mines is acquired at the expense of economy. The Government testing station, which was established by the Administration of Mines at Frameries, has achieved commendable results, which have caused the establishment of corresponding testing stations in other countries, including the United States. There can be no question but that fatalities due to gas and dust explosions have been reduced as the result of the excellent work of the Belgian testing station. Great Britain and Germany also maintain testing stations, where every question relating to the testing of explosives, safety lamps, rescue devices, and all similar matters may be submitted to experimental studies. As the result of this foresight, great reductions have been made in the number of accidents in the coal mines of those countries.

Austria-Hungary recognizes three classes of mines:

1. Gaseous or fiery mines.
2. Medium gaseous mines.
3. Non-gaseous mines.

The use of powder is absolutely forbidden in all mines in the first class. It is recommended that mechanical means for bringing down the coal be used in all mines of the second class. This division is a very good one and the following illustrates the danger of using both naked and safety lamps in the same mine. [a]Statistics show that Wales, Monmouthshire and Scotland though employing less than two-thirds of the number of men employed in England, and though producing only a little more than half (55–100) of the tonnage produced in England, had more than four times as many explosions from the use of naked lights. Last year only seven explosions were due to safety lamps, as compared with 130 caused by naked

[a] Extract from *Accidents in the Coal Mines of Great Britain*, Engineering and Mining Journal, May 7, 1910.

lights. The official reports say: "So long as mines which occasionally produce firedamp are worked with naked lights, explosions of this class will continue to occur and existing rules are inadequate to prevent them." Thus in the eastern portion of Scotland, out of a total of 35 explosions, 32 were due to ignitions of firedamp by naked lights.

United States

It is of interest to note the following lines of work which are being taken up by the Technologic branch of the United States Geological Survey:

1. A study of the source and liability to ignition and explosion of the gases present in mines.
2. An examination of dusts to determine their relative inflammability.
3. A study of various types of safety lamps.
4. The extent to which electricity may be safely used and the conditions under which a spark will ignite dust and thus cause an explosion.
5. A study and test of various types of rescue apparatus. Field work is being done in the examination of localities where explosions have occurred with a view to determining the cause of the explosions. As actual mining conditions cannot always be duplicated in the laboratory, experiment stations are to be established in different mines. A small mine is also to be devoted exclusively to experimental work.
6. A test of all explosives at present on the market, the results of which are published.

The following is a copy of a despatch respecting the Report on the Prevention of Mine Explosions; Prepared by Three Foreign Experts for the United States Geological Survey, and published October 22, 1908:

> "The Geological Survey issues to-day a report on the prevention of mine explosions, submitted by three foreign experts, Victor Watteyne, inspector-general of mines, Belgium; Carl Meissner, councillor for mines, Germany; and Arthur Desborough, H.M. inspector of explosives, England. These engineers have been to the United States for six weeks, coming at the invitation of the United States Government to assist the Federal authorities in beginning the investigations authorized at the last session of Congress. The report was presented to Secretary Garfield, who transmitted it yesterday to President Roosevelt, stating that the report with its recommendations will be of the highest importance in aiding Congress and the different state governments in providing legislation to ensure more efficient and careful operation of coal mines, by the adoption of mining methods and safety appliances that will materially aid in preventing such terrible losses of life as have occurred through mine explosions in recent years."
>
> In view of the fact that this report is the first result of the Geological Survey's scientific and practical study of the conditions under which more than half a million miners work, the President ordered its immediate publication and distribution among the coal-mine operators and miners of the country. The report is addressed to the Secretary of the Interior, and is as follows:

REPORT ON MINE EXPLOSIONS

In response to your request that we co-operate with the United States Geological Survey in the inauguration of its investigations looking to the prevention of mine explosions, and that we submit for the consideration of those connected with the coal-mining industry in the United States such recommendations as experience in our own countries and observations among American coal mines indicates may be useful in providing for greater safety, we beg to submit the recommendations given below.

Since coming to the United States we have given careful attention to and approve the investigations in relation to this subject begun by the Geological Survey. We have visited typical mines in the more important coal fields of the United States and have discussed the mining problems with many coal operators, miners and state inspectors.

To be effective, investigations for the benefit of mining must be continuous. The opening up of new mines, the deepening of old mines, the meeting with new conditions, the changing of explosives, and the inauguration of new processes and methods will call for continuous investigations to be followed by continuous educational work.

Our investigations and recommendations relate primarily to questions of safety in mining; but, in this connection, we have been greatly impressed with another closely associated phase of the industry, viz., the large and permanent loss of coal in mining operations in many portions of the United States. This is a serious, permanent and national loss. It seems to be a natural outcome of the ease with which coal has been mined in the United States and the enormously rapid growth of the industry.

The active competition among the operators, and the constant resulting effort to produce cheaper coal, has often naturally led to the mining of only that part of the coal which could be brought to the surface most easily and cheaply, leaving underground, in such condition as to be permanently lost, a considerable percentage of the total possible product. Certainly much of this loss can be prevented through the introduction of more efficient mining methods, such as the long-wall system, more or less modified, the flushing method. (See "H" 7.)

In the preparation of these recommendations we have recognized fully the great differences between the mining conditions in Europe and those in America, where the industry has developed so rapidly that thorough organization has not yet been possible; where a large percentage of the men entering the mine are unfamiliar either with mining methods or the English language; and where the price of coal at the mine is less than half that in Europe. Nevertheless, we believe that these recommendations will be found useful in the further development of the American coal-mining industry for safety and efficiency. The cordial reception everywhere accorded us leads us to believe that these recommendations will be received by the operators and miners in the same spirit of good-will as that in which

they have been prepared. But the success of this movement for greater safety and efficienty will depend upon the hearty and patient co-operation of the operators and the miners, working together for the accomplishment of this purpose.

RECOMMENDATIONS —A. Selecting the Explosives to be Used.—(1) We recommend that the Government of the United States examine the explosives now and hereafter used in mining, with a view to eliminating the more dangerous explosives and to improving and standardizing such explosives as may be considered most suitable for such use, these to be designated by the Government "permissible explosives."

The term "permissible explosives" is suggested for the reason that no explosives are entirely safe, and all of them develop flame when ignited; and we advise, therefore, against the use in the United States of the terms "safety explosives" or "flameless explosives," as these terms may be misunderstood and this misunderstanding may endanger life.

(2) We recommend that the operators and miners of coal use only such explosives as are included in a list of "permissible explosives" when the same has been published by the Government, in all mines where there is risk of igniting either dust or gas, selecting that one which their own experience indicates can be used to the best advantage under local conditions.

(3) We also recommend that investigations be conducted to determine the amount of charge of such "permissible explosives" which may be used to the best advantage under different conditions, with a view to reducing danger to the minimum.

B. Carrying the Explosives into the Mines.—(1) All explosives should be made into cartridges and placed in closed receptacles before being carried into the mine, and the quantity carried in the mine during one day by any miner should be limited, as nearly as practicable, to the quantity needed by him for use during that day. Handling loose explosives and making them into cartridges by an open light in the mine should be prevented.

(2) Detonators or caps should be handled with great care, and should be carried only by a limited number of responsible persons.

C. Use of Explosives in the Mine.—(1) Shooting in or off the solid should not be practised.

(2) The depth of the shot hole should be less by at least 6 inches than the depth of the cutting or mining. The use of very deep shot holes should be avoided as unnecessarily dangerous.

(3) The overcharging of shots (the use of a larger charge than is required to do the work satisfactorily) should also be avoided as unnecessary and dangerous. The proper standardization of explosives used in coal mining will greatly facilitate the carrying out of this recommendation. (See also "A" 1.)

(4) Shots should never be tamped with fine coal or material containing coal. Clay or other suitable material should be supplied and used for this purpose.

(5) The firing of two or more shots in one working place, except simultaneously by electricity, should not be allowed until a

sufficient interval has elapsed between the firings to permit an examination of the working places, in order to see whether any cause of danger has arisen.

(6) Before a shot is fired, the fine coal should be removed from the working place, as far as practicable, and the coal dust on the floor, sides and roof, for a distance of at least 20 yards from the place where the shot is to be fired should be thoroughly wet, unless it has been demonstrated that the dust in the mine is not inflammable. (See also "E" 1.)

(7) If gas is known to occur in the mine, no shot should be fired until, in addition to the watering, an examination made immediately preceding the time for firing, by a competent person, using a lamp which will easily detect 2 per cent. of gas, has shown the absence of that amount of gas from all spaces within twenty yards of the point where the shot is to be fired.

(8) Believing that such will be one of the greatest advances which can be made in safeguarding the lives of miners, we recommend the adoption of a system of electric shot firing, in all mines where practicable, by which all shots in the mine, or in each ventilation district of the mine, may be fired simultaneously, at a time when all miners and other employees are out of the mine.

D. Keeping the Mine Roadways Clean.—(1) The roadways of the mine should be kept as free as possible from loose coal which may ground into dust and of rubbish in which such dust may accumulate, in order to facilitate the removal and wetting of the dust.

E. Wetting the Coal Dust.—(1) In all coal mines where explosives are used it is desirable, and in all mines containing gas it is highly important, that the dust on the walls, timbers and floors of the working places and roadways should be kept continually wet prior to and during the work in the mine. If, however, conditions of roof or lack of water render this general watering impracticable, at least the dust within twenty yards of each shot should be wet before each firing, and other precautions against explosions should be practised with unusual care.

It is our opinion that a system of watering which occasionally sprinkles the floor only and leaves dry the dust on the walls and timbers of the roadways is useless, and is also dangerous, in that it may generate an unwarranted feeling of security against an explosion.

F. Special Precautions for Mines Containing Gas.—(1) In any mine where as much as 2 per cent. of gas can be detected by suitable method, only locked safety lamps of an approved type should be used so long as such condition exists or is likely to recur.

All safety lamps should be maintained in good condition, cleaned, filled, kept in a special room at the surface, and carefully examined, both when delivered to the miner and when returned by him at the close of each day's work. A defective safety lamp is especially dangerous because of the false feeling of security it engenders.

In the filling of lamps with benzine or other low-flash oils, which should always be done at the surface, special precautions aganist fire or explosions should be taken.

G. Use of Electricity.—(1) Electricity in mining operations offers so many advantages, and has been so generally adopted, that no reasonable objection can be made to its use under proper restrictions. The electrical equipment, however, should be installed, maintained and operated with great care, and so safeguarded as to minimize danger from fire or shock. The fact that the effectiveness of some insulating materials are soon destroyed in most mines should not be lost sight of.

We recommend the following precautions: For distribution underground the voltage should not exceed 650 direct current or 500 alternating current, these voltages being intended for transmission to machinery operating at 500 volts direct current and 440 volts alternating current, respectively. Even lower voltages are preferable. The trolley wires should be installed in such manner as to render shocks least likely; that is, placed either high enough to be beyond easy reach, or at one side of the track and properly protected.

Where current at a potential of more than 650 volts is employed for transmission underground, it should be transmitted by means of a completely insulated cable; and where a lead or armoured covering is used, such covering should be grounded.

In all mines having electrical installation, special precautions should be taken against the setting on fire of coal or timber. Enclosed fuses or cutouts are recommended, and each branch heading should be so arranged that the current may be cut off when necessary.

No live electric wire should be permitted in that part of any mine in which gas is found to the amount of 2 per cent.

In all mines producing gas in dangerous quantities, as indicated by a safety lamp which will detect 2 per cent. of gas, the working places should be examined for gas by a qualified man, using such a lamp, immediately before any electric machine is taken or operated there.

H. Precautions against Miscellaneous Accidents —(1) In all new construction, shaft lining and superstructures about the entrance of the shaft (or slopes or drifts) should be built as far as practicable of non-combustible materials.

About the entrances to mines every possible precaution should be taken to prevent fires or the injury of the equipment for ventilation and haulage. Ventilating fans should be placed at one side of the mine opening, and hinged doors or light timbering should render easy the escape of the explosive force in a direct line of the shaft or slope.

Proper precautions should be taken for immediately preventing the entrance into the mine of heat and gases and for facilitating the escape of the men in case of surface or shaft fires.

(2) The surface equipment of handling the coal should be so arranged as to prevent coal dust from entering the mine shaft.

(3) In all new mines, and in all old mines as far as practicable, suitable main roads should be provided for the men separate from the main haulage roads.

(4) In connection with the system of ventilation it is recommended that in the more frequented roads connecting the intake with the return air courses, two doors be provided, these doors to be placed at such a distance apart that while one is open, the other is closed.

(5) In view of the large number of accidents from falls of coal or roof, under the existing practice with single props, more attention should be given to the introduction in mines where the roof is bad, of better systems of timbering, such as have been long in use with economy and safety in many well managed mines.

(6) In undercutting coal by hand, the premature fall of the coal should be prevented by sprags or other suitable supports.

(7) We believe that the difficulties and dangers encountered in the working of coal seams which are thick and steeply pitching, or of which the coal is highly inflammable in character or subject to firing from spontaneous combustion, and in mines where the subsidence of the surface must be avoided, may be successfully and economically overcome in many cases through the adoption of the flushing system of mining—that is, the filling with sand or other similar materials the space from which the coal is removed. This system originated in the United States and is now successfully practised in portions of Germany, Austria, Belgium and France.

I. Mine Supervision and Inspection.—(1) We cannot too strongly emphasize the fact that thorough discipline about the mine is absolutely essential to safety, and that thorough discipline can be brought about only through the hearty co-operation of the operators, the miners, and the State.

(2) We are of the opinion that the responsibility for safety in the mine should primarily rest with some person, such as the manager or superintendent, clothed with full authority; and that such person can greatly facilitate the attainment of safety through the employment of a sufficient number of foremen, and also of one or more inspectors, whose special duty it shall be to see that the regulations are strictly enforced.

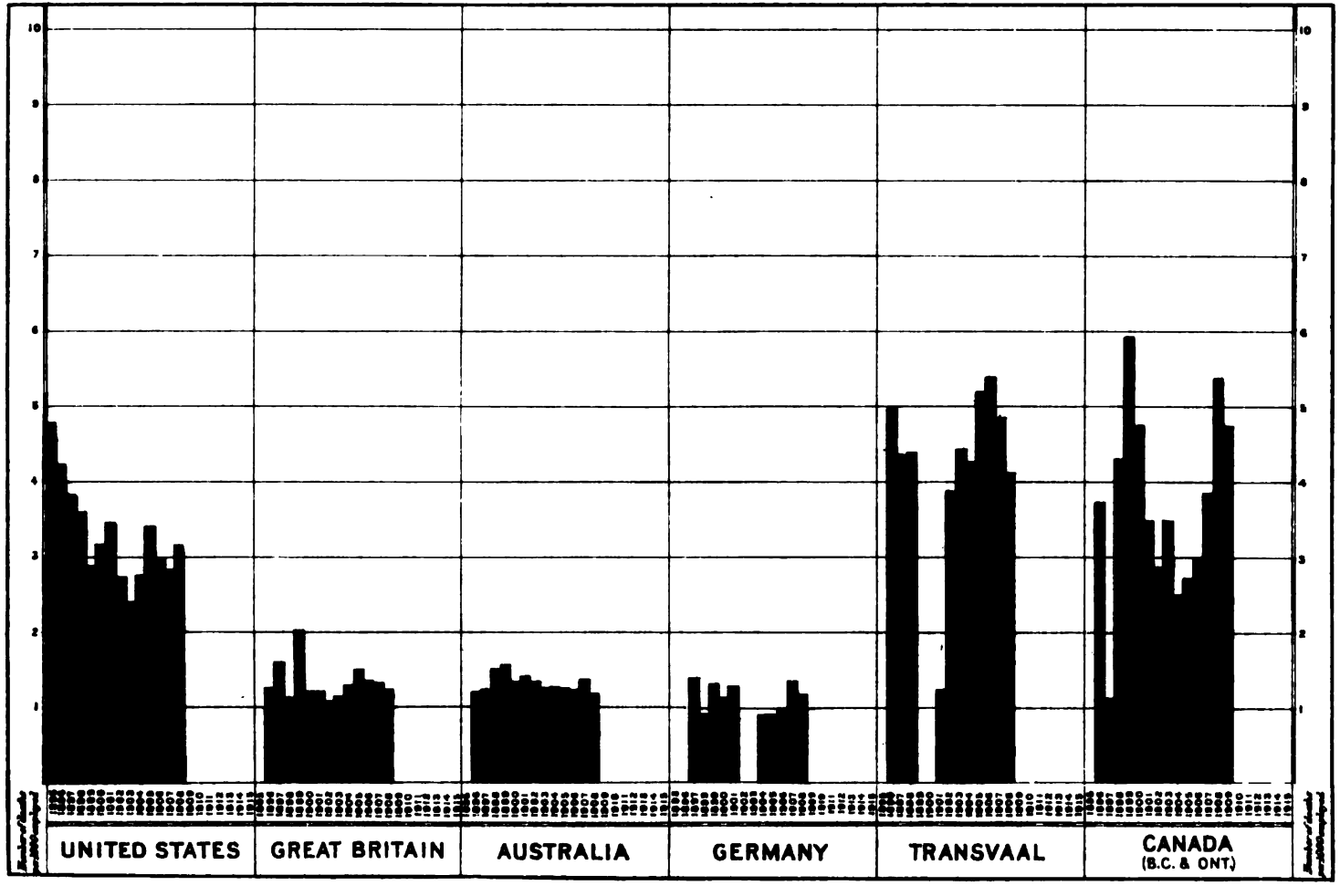
(3) The State cannot exercise too much care concerning the experience, technical training and selection of its inspectors. Their positions should he made independent of all considerations other than that of efficiency, and their continuance in the service should be co-existent with good behaviour and proper discharge of official duty.

J. Training of Mine Firemen, Inspectors, etc.—We are of the opinion that the cause of both safety and efficiency in coal-mining in the United States would be greatly aided through the establishment and maintenance in the different coal regions, of special schools for the training of fire bosses, mine foremen, superintendents and inspectors. The instruction in such schools should be practical, rather than theoretical.

The work of these schools would supplement most effectively that of the colleges already established in many parts of the country for the more thorough training of mining engineers.

METAL-MINE ACCIDENTS

Number of men killed for each thousand employed



Metal Mine Accidents

It is generally supposed that a great many more men are killed in coal mines than in metal mines. The following tables show that during 1900–09 the average fatality rate per thousand men employed in the coal mines of Canada was 4.79; and, for the metal mines, 3.82.

TABLE IV

SHOWING COAL MINE ACCIDENTS IN CANADA, 1900–1909

Year	British Columbia			Nova Scotia			Canada
	Number of Men Employed	Fatal Accidents	Fatality Ratio per 1,000 men Employed	Number of Men Employed	Fatal Accidents	Fatality Ratio per 1,000 Men Employed	Average Fatality Ratio per 1,000 Men Employed
1900	4,178	17	4.06	6,626	21	3.17	3.51
1901	3,974	102	25.67	7,663	14	1.82	9.96
1902	4,011	139	34.65	8,062	21	2.60	13.25
1903	4,264	42	9.85	11,092	31	2.88	4.75
1904	4,453	37	8.31	11,659	27	2.40	3.97
1905	4,407	12	2.72	10,780	20	1.85	2.10
1906	4,805	15	3.12	12,123	29	2.39	2.59
1907	6,059	31	5.11	12,107	37	3.05	3.74
1908	6,095	18	2.95	12,933	45	3.48	3.31
1909	6,418	57	8.88	12,083	34	2.81	4.21[a]
Totals and Averages	48,664	470	9.65	105,128	279	2.65	4.79

TABLE V

SHOWING ACCIDENTS IN THE METALLIFEROUS MINES OF CANADA 1900 – 1909

Year	British Columbia[b]			Ontario[c]			Canada
	Number of Men Employed	Fatal Accidents	Ratio per 1,000 Men Employed	Number of Men Employed	Fatal Accidents	Ratio per 1,000 Men Employed	Average Ratio per 1,000 Men Employed
1900	3,739	13	3.47	3,980	17	4.27	3.88
1901	3,948	12	3.09	4,685	13	2.77	2.89
1902	3,345	12	3.58	4,876	10	2.05	2.67
1903	2,476	17	6.86	3,899	7	1.79	3.78
1904	3,306	14	4.24	3,875	7	1.80	2.92
1905	3,596	14	3.89	4,915	9	1.83	2.70
1906	3,718	17	4.61	5,767	11	1.90	2.95
1907	3,697	20	5.41	7,345	22	2.99	3.80
1908	3,537	21	5.93	9,185	47	5.11	5.34
1909	3,037	15	4.93	10,505	49	4.66	4.72
Totals and Averages	34,399	155	4.50	59,032	192	3.25	3.82

[a] Including Alberta.
[b] Reports of the Bureau of Mines, British Columbia.
[c] Nineteenth Annual Report, Bureau of Mines, Ontario, 1910.

The fatality rates for the principal mining countries of the world are given below. With few exceptions they are for the period 1899–1906 and were compiled by F. L. Hoffman, Statistician, Prudential Insurance Company, from the reports of the chief mine inspectors of the United Kingdom.[a]

Algeria, chiefly iron mines, average rate 1.38 per thousand.

Austria-Hungary, iron mines, 1.48; other metal mines 3.11 per thousand.

Bohemia, iron mines, 1.67; other metal mines 0.81 per thousand.

Bosnia and Herzegovina, iron mines, 1.84; other metal mines 0.82 per thousand.

Belgium, metal mines 0.75 per thousand.

France, metal mines, 2.02 (for men working underground the rate was 2.49, and for men working overground, 0.92 per thousand).

Germany, ore mines and smelting works, 1.07; Prussia considered separately, 1.08, and Saxony 0.81 per thousand.

Italy, metal mines, including sulphur, 1.73. In Italy, the fatal-accident liability in sulphur mines alone, during the 10-year period ending with 1899 was 2.84 per thousand.

Japan, metal mines (1903–1906) 1.50 per thousand.

Portugal, metal mines, 0.95; but for underground workmen alone the rate was 2.15 per thousand.

Spain, chiefly metal mines, but including some coal mines, 2.65 per thousand.

Russia, gold mines (1901-1903), 0.55 per thousand.

United Kingdom, metalliferous mines, 1.14; but underground workmen alone, 1.67, and workmen overground 0.39 per thousand.

New South Wales, alluvial gold mines 0.54; gold quartz mines, 0.87; silver and lead mines, 2.49; copper mines, 1.22; tin mines, 0.38; and other metal mines, 0.83 per thousand. (In the Broken Hill district the percentage of cases of lead poisoning averaged during the decade 1897-1906, 0.32, but the ratio was as high as 1.12 per cent. in 1902).

Tasmania, metal mines (1901-1906), 1.19 per thousand.

Victoria, gold mines, 1.08 per thousand.

Queensland, gold mines, 1.70 per thousand.

Western Australia, gold mines, 2.15 per thousand.

British Guiana, gold mines, 0.28; alluvial placer gold mines in 1895, 8 per thousand.

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[a] Engineering and Mining Journal, March 5th, 1910.

Kimberley, diamond mines (white miners only), 1.36; underground workmen considered alone, 5.28; and workmen above ground 0.47; (coloured miners only, 3.60); workmen underground only, 7.27, and above ground, 1.71 per thousand.

South African Republic (1895-1898), white miners, 5.41; coloured miners, 4.44; total, 4.56 per thousand. (See Transvaal).

Ceylon, metalliferous mines, mostly plumbago, 0.37; underground 1.01; overground, 0.07 per thousand.

Gold Coast, gold mines (1898, 1903-1906), 2.41; workmen underground, 6.03; overground, 0.54 per thousand.

India, gold mines, 2.24; underground, 3.23; overground, 0.70 per thousand.

India mica mines, 0.75; underground, 1.18; overground 0.13 per thousand.

India, manganese (1901-1906), 0.37 per thousand.

India (Mysore) gold mines, 2.51 per thousand.

New Zealand, alluvial gold mines 1.53; quartz gold mines, 1.32 per thousand.

Transvaal (1902-1906), gold mines, white labor, 4.15; coloured native labour, 4.74; Chinese labour, 6.50 per thousand.

The average fatality rate in the United States during the period (1894-1908) was 3.09. This rate was considered so high that, in 1906, the American Mining Congress at Denver, Colorado, appointed a committee to draft a law for the regulation of quarrying and metalliferous mining under the criminal codes of the States, with the hope that the uniform adoption of such a law would tend to reduce the number of accidents. The report of this committee is contained in Bulletin No. 46, of the American Institute of Mining Engineers. (See Appendix I.)

With the exception of the Kimberley diamond mines and the Transvaal, where native and Chinese labour are employed, the fatality rate during 1900-1909, was considerably lower elsewhere than in Canada. It requires no discussion to emphasize the importance of a inquiry into the whole subject of fatal accidents in metal mines of Canada.

An analysis of the statistics respecting metal mining accidents of British Columbia for the last ten years, shows that over twenty-six per cent. of the fatalities were caused by explosives directly or indirectly. Mr. E. T. Corkill, Inspector of Mines for Ontario, states, in the Nineteenth Annual Report of the Bureau of Mines (p. 58), that, "Accidents from explosives are the main source of danger, and were, ultimately the cause of 49 per cent. of the fatalities in 1909." An Act respecting the testing and inspection of explosives has been prepared by the Mines Branch, Department of Mines, and will be presented to Parliament this session.

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1909*

(Subject to revision)

Product		Quantity (a)	Value (b)
Metallic			
Copper (c)	Lbs.	54,061,106	$7,018,213
Gold		.....	9,790,000
Pig iron from Canadian ore (d)	Tons	149,444	2,222,215
Iron ore (exports)	"	21,956	61,965
Lead (e)	Lbs.	45,857,424	1,959,488
Nickel (f)	"	26,282,991	9,461,877
Cobalt		.....	66,319†
Silver (g)	Ozs.	27,878,590	14,358,310
Zinc		.....	250,000
Total value metallic		.....	45,188,387
Non-Metallic			
Arsenic	Tons	1,129	64,100
Asbestos	"	63,349	2,284,587
Asbestic and asbestic sand	"	23,951	17,188
Chromite (exports)	"	1,794	20,858
Coal	"	10,411,955	24,431,351
Corundum	"	1,491	157,398
Feldspar	"	10,286	35,694
Graphite	"	730	37,624
Grindstones	"	3,965	50,944
Gypsum	"	468,551	667,816
Magnesite	"	330	2,508
Mica	"	.....	154,106
Mineral pigments—Ochres and Barytes	"	4,119	29,213
Mineral waters		.....	177,304
Natural gas (h)		.....	1,205,943
Petroleum (i)	Brls.	420,755	559,604
Phosphate (apatite)	Tons	597	4,618
Pyrites	"	57,038	196,312
Quartz	"	50,541	63,032
Salt	"	84,037	415,219
Talc	"	4,506	12,172
Total value, non-metallic		.....	$30,587,591

(a) Quantity of product sold or shipped.

(b) The metals, copper, lead, nickel and silver, are for statistical and comparative purposes valued at the final average value of the refined metal in New York. Pig iron is valued at the furnace, and non-metallic products at the mine or point of shipment.

(c) Copper contents of smelter products and ores exported at 12.982 cents per pound.

(d) The total production of pig iron in Canada in 1909 was 757,162 tons, valued at $9,581,864, of which it is estimated 607,718 tons, valued at $7,359,649, should be credited to imported ores.

(e) Refined lead and lead contained in base bullion exported at 4.273 cents per pound.

(f) Nickel contents of matte produced, at 36 cents per pound (the lowest quotation for nickel in New York, less 10 per cent). The value of the nickel contained in matte was, as returned by the operators, $2,810,748, or an average per pound of 10.7 cents.

(g) Estimated recoverable silver at 51.503 cents per ounce.

(h) Gross returns for sale of gas.

(i) Quantity on which bounty was paid and valued at $1.33 per barrel.

* Summary Report of Mines Branch, 1909.

† Additional returns increase this item to $90,950.

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1909—*Continued.*

Product	Quantity (a)	Value (b)
Structural Material and Clay Products		$
Cement, Portland.....Brls.	4,010,180	5,266,008
Clay products—		
Brick.....	.....	4,200,000
Sewer pipe, fireclay, drain tile, etc.....	.....	1,300,000
Lime.....Bush.	5,163,874	1,049,473
Sand and gravel (exports).....Tons	481,584	256,166
Stone—		
Granite.....	.....	340,047
Limestone for flux in blast furnaces.....	.....	328,091
Marble, limestone and sandstone.....	.....	1,600,000
Total structural material and clay products ..	.....	14,339,785
All other non-metallic.....	.....	30,587,591
Total value non-metallic.....	.....	44,927,376
Total value, metallic.....	.....	45,188,387
Estimated value of mineral products not reported.....	.....	300,000
Total value, 1909.....	.....	$90,415,763

REMARKS.—The preliminary table of mineral production in Canada, given herewith, shows the total value of the production in 1909 to have been in excess of $90,000,000. Compared with the total value for 1908—$85,927,802—it shows an increase of a little over five per cent. The actual increase or betterment in the industry in 1909, was, however, somewhat greater than is indicated by this comparison. Owing to a slight change in the method of compiling statistics of the quantities of metals produced, the values for 1909 are somewhat less than they would otherwise have been.

Of the total production in 1909, $45,188,387—or 49.9 per cent of the total—is credited to the metals, and 44,927,376—or 49.7 per cent—to non-metallic products. Among the individual products coal is still the most important, its value constituting twenty-seven per cent of the total; silver occupied second place with 15.9 per cent; gold and nickel come next with 10.8 and 10.5 per cent respectively; copper contributes 7.8 per cent; cement 5.8 per cent; clay products 6.1 per cent; and asbestos 2.5 per cent.

THE MINERAL PRODUCTION OF CANADA IN 1910 [a]

(Subject to revision)

Product		Quantity	Value
Metallic			$
Copper, value at 12·738 cents per pound	Lbs.	56,598,074	7,209,463
Gold		.....	10,224,910
Pig iron from Canadian ore	Tons	104,906	1,651,321
Iron ore (exports)	"	114,449	324,186
Lead, value at 3·75 per pound	Lbs.	32,987,508	1,237,032
Nickel, value at 30 cents per pound	"	37,271,033	11,181,310
Silver, value at 53·486 cents per oz.	Ozs.	31,983,328	17,106,604
Zinc ore and other products		.....	235,000
Total		.....	49,169,826
Non-Metallic			
Arsenic, white	Tons	1,502	75,328
Asbestos	"	75,678	2,458,929
Asbestic	"	24,707	17,629
Coal	"	12,796,512	29,811,750
Corundum	"	1,870	198,680
Feldspar	"	15,719	47,867
Fluorspar	"	2	15
Graphite	"	1,243	59,087
Grindstones	"	3,847	43,936
Gypsum	"	513,313	939,838
Magnesite (railway shipments)	"	328	2,493
Mica	"	.....	143,409
Ochres	"	4,813	33,185
Mineral water		.....	175,173
Natural gas		.....	1,312,614
Peat	Tons	771	1,735
Petroleum, value at $1.23 per barrel	Brls.	315,895	388,550
Phosphate	Tons	1,319	11,780
Pyrites	"	55,925	192,263
Quartz	"	88,205	91,951
Salt	"	84,092	409,624
Talc	"	7,112	22,308
Tripolite	"	22	134
Total		.....	36,438,278
Structural Materials and Clay Products			
Cement, Portland	Brls.	4,753,975	6,414,315
Clay products—			
Brick		.....	5,930,630
Sewer pipe, fireclay, drain tile, pottery, etc.		.....	1,669,370
Lime	Bush.	5,721,285	1,131,407
Sand and gravel (exports)	Tons	624,824	407,974
Sand lime brick		.....	360,894
Slate		.....	18,492
Stone—			
Granite		.....	634,783
Limestone		.....	2,303,804
Marble		.....	158,779
Sandstone		.....	402,406
Total structural materials and clay products		.....	19,432,854
All other non-metallic		.....	36,438,278
Total value, metallic		.....	49,169,826
Total value, 1910		.....	105,040,958

[a] Preliminary Report of Mines Branch.

APPENDIX I

Report of Committee on Uniform Mining Laws for Prevention of Mine Accidents[a]

To the

American Mining Congress.
American Institute of Mining Engineers.
Mining and Metallurgical Society of America.

The committee that makes this report was appointed at the meeting of the American Mining Congress, at Denver, Colo., in November, 1906. The appointment had in view the drafting of a law for the regulation of quarrying and metalliferous mining under the police laws of the States, with the hope that the uniform adoption of such a law could tend to reduce the number of accidents in mining.

Since its appointment, the committee has had under serious and continuous consideration the matter with which it was charged. At the meetings of the American Mining Congress in 1907, 1908 and 1909, it reported progress. At the meeting in 1909 it was authorized to present its report not only to the American Mining Congress, but also to the American Institute of Mining Engineers and the Mining and Metallurgical Society of America, and to present its report in printed form during the interim between meetings of the American Mining Congress.

The committee collected from the officials of the States of the Union copies of their mining laws. With the assistance of the *Engineering and Mining Journal* copies of the laws of Great Britain, the Transvaal, New South Wales, Victoria, Queensland, Western Australia, Tasmania, New Zealand, and certain European countries were also obtained. These laws were subjected to careful study. The first publication of the committee was a summary of the more important metalliferous mining laws of this country. Upon the basis of the existing laws of the States of the Union, Great Britain, and the English speaking colonies, a tentative draft was prepared and printed in limited number in 1909, for convenience in securing the advice and criticism of a considerable number of persons engaged in the mining industry. In this way valuable suggestions were received.

At the request of the chairman of this committee, Mr. Frederick L. Hoffman, statistician of the Prudential Insurance Company, of Newark, N. J., summarized and reviewed the available statistics of fatalities in metalliferous mining in the United States. Mr. Hoffman's report was published in the *Engineering and Mining Journal* of March 5, 1910, and accompanies this report as appendix B. No such summary of fatal accidents in the United States has heretofore been compiled, so far as we are aware.

The deficiencies of his report are frankly recognized by Mr. Hoffman. He has made the most out of the data available, but unfortunately, to the discredit of our mining industry, the available data are scanty. For only

[a] Transactions of the American Institute of Mining Engineers. This Report is published by the Society as subject to revision.

six States has it been possible to secure statistics extending over a long series of years. The other States do not report them. Consequently, the figure reached by Mr .Hoffman must be regarded as indicative rather than as absolute.

The probability is, however, that the actual ratio of fatal accidents in metal mining is larger than the figure reported by Mr. Hoffman, because his figure is based chiefly upon the States which have provided the best mining laws and the best systems of mine inspection. The good of these things is clearly shown by the statistics. Thus, in Colorado and Montana, which among the Western States are conceded to have the best laws, the general tendency of the fatality ratio has been downward. We are led to believe that if those States and Territories like California, Nevada, Arizona, New Mexico and Utah, which have not had either adequate mining laws or systems of mine inspection, could be summarized in the same way, the general ratio of lives lost per 1,000 men employed would be increased.

Mr. Hoffman clearly established something that has been strongly suspected, namely that the loss of life in metal mining in the United States is fully as great as in coal mining. Mr. Hoffman has arrived at the average of 3.09 per 1000 in metal mining, as compared with 3.13 in coal mining. Bearing in mind the condition that we have mentioned above and the fact that the statistics for coal mining are far more complete than for metal mining, we surmise that the loss of life in metal mining in the United States is actually larger, proportionally, than in coal mining. This emphasizes the importance of a movement to remedy bad conditions.

Draft for a Law.—The chief work of the committee has been in the preparation of a draft for a law. In this work it has invited and received the assistance of several members of the bar, especially Dr. Rossiter W. Raymond, of New York, E. E. Ellinwood, Esq., of Bisbee, Arizona, and Archibald Douglas, Esq., of New York. To the valuable co-operation of Mr. Douglas, who devoted a great deal of time to the matter, particular acknowledgment is due. Mr. Douglas prepared the draft for a law finally adopted by the committee, which accompanies this report as appendix A.

In the preparation of this draft, the committee has had in mind the preparation of a law that will be effective, and not merely a code of rules and regulations of which the enforcement will be largely optional. The committee has aimed to fix responsibility upon operator, superintendent, foreman and miner respectively, and the failure on their part to comply with the terms of the law is to be punishable by suitable penalties. The enforcement of the law is charged primarily upon the inspector of mines, who is to be to all intents and purposes a policeman.

The conditions of mining in the various parts of the United States are widely different. The basic laws of the several States also differ to more or less extent. It has been beyond the ability of this committee to draft a law, which it can say with assurance will be equitable under all conditions obtaining in mining in the United States; or will be in conformity with the basic laws of all the States. Consequently, the committee presents its present draft as a preliminary, and invites criticism for its assistance in preparing a final report.

Although the duties of this committee were limited to quarrying and metalliferous mining, the committee suggests that its draft for a law may advantageously be made to apply to all kinds of mining in those States

which have no special colliery law. Coal mining and metal mining do not differ in principle to so great an extent as is popularly supposed. The fundamental rules for safety in metal mining apply also to coal mining, but the latter has dangers peculiar to itself which should be considered in special provisions in those States where coal mining is extensively carried on.

MINE INSPECTION.—In the opinion of the Committee, the essential steps toward reducing the loss of life in metalliferous mining are (1) a comprehensive and effective law; and (2) an adequate system of mine inspection. The latter is the keystone of progress. Much can be accomplished by an adequate system of mine inspection, even if a comprehensive law be lacking, but no matter how thorough and effective in theory a law may be, it will fail in its purpose unless provision be made for its sincere, impartial and positive enforcement by an adequate system of competent mine inspection.

To secure such a system of mine inspection, the States must appropriate a good deal more money than any has yet done. Each State must have a mine inspector, and he must be provided with a sufficient number of deputies to enable frequent inspections of all operating mines to be made. One inspection of a mine in a year is not enough. The inspector and deputies must, moreover, be provided with proper funds for clerical work, traveling expenses, etc. So far as we are aware, the State of Colorado makes the largest appropriation for inspection of metal mines, its appropriation being $25,000 per year. Other important mining States appropriate only $10,000. In the opinion of the committee, such appropriations are utterly inadequate. For States possessing a mining industry of the importance of that of Colorado, Utah, Montana, Nevada, California, and, in fact, all of the States and territories west of the Rocky Mountains, an annual appropriation of $50,000 to $100,000 per State is necessary. Such expenditures are thoroughly justified by the importance of the end to be gained. At the present time the number of persons killed annually by accident in the metalliferous mines of the United States is probably in the neighbourhood of 500, estimating upon the rate of 3.09 per thousand, as determined by Mr. Hoffman. In many important foreign countries, the death rate is less than 1½ per thousand. We operate in this country at a more intense rate than in many foreign countries, and perhaps our death rate per tonnage of ore produced per man would not compare so unfavorably, and because of this more intense operation it may be impossible for us to attain the low rates of some foreign countries. It must be borne in mind that it is not only underground, but also overground, that accidents are more numerous in this country than in Europe. There is a spirit of recklessness in this whole land that leads people to take risks that the European population avoids. But certainly our mining practice is capable of great improvement with respect to the safety of the miners, and the magnitude of the annual loss justifies a large State expenditure for the purpose of its reduction.

Consequently, the committee emphasizes strongly that the reduction of loss of life in mining is dependent chiefly upon the money that the people of the respective States are willing to spend for the enforcement of their mining laws, and in such expenditures the committee urges great liberality.

It is essential that mine inspection be impartial—absolutely free from all political, personal and selfish interests; and, moreover, that it be competent. In its draft for a law, the committee has incorporated, after very careful consideration, qualifications for mine inspectors, which, in its opinion, will provide the essential conditions stated above.

New York, Sept. 1, 1910.

Respectfully submitted,

WALTER RENTON INGALLS, *Chairman.*
J. PARKE CHANNING
JAMES DOUGLAS
J. R. FINLAY
JOHN HAYS HAMMOND

APPENDIX A. AN ACT, ETC.

SEC. 1. DEFINITION OF TERMS.—The terms of this Act shall apply to all quarries and metalliferous mines in the State of —— employing more than 10 persons in any period of 24 hours.

MINE. The term "Mine" when used in this Act is intended to include quarries and prospect openings; and to mean any and all parts of the property of a mine, prospect, quarry and mining plant on the surface or underground which contribute directly or indirectly to the mining or handling of minerals. But the term "Mine" shall not apply to collieries.

OPERATOR. The term "Operator" when used in this Act means the person, firm or body corporate in immediate possession of any mine and its accessories as owner or lessee thereof, and as such responsible for the condition and management thereof.

SUPERINTENDENT. The term "Superintendent" when used in this Act means the person who shall have the immediate supervision of the mine.

MINE FOREMAN. The term "Mine Foreman," when used in this Act, means a person who is charged at any one time with the general direction of the underground work.

INSPECTOR AND DEPUTY. The term "Inspector," when used in this Act, signifies the State Inspector of Mines, and the terms "Deputy" and "Deputy Inspector," when used in this Act, mean a State Deputy Inspector of Mines.

EXCAVATIONS OR WORKINGS. The words "Excavations" and "Workings" when used in this Act, signify any or all parts of a mine, excavated or being excavated, including shafts, tunnels, entries, galleries, open cuts and all working places, whether abandoned or in use.

SEC. 2. OFFICE OF INSPECTOR OF MINES.—The office of Inspector of Mines for the State of ——— is hereby created.

The Governor of the State, by and with the advice and consent of the Senate, shall appoint such Inspector of Mines. The Inspector of Mines shall be at least 30 years of age, a citizen of the United States, a resident of this State for at least one year previous to his appointment, and shall be practically engaged in metalliferous mining, and shall have had at least

10 years' experience in underground mining in the United States of America The Inspector of Mines (but not the deputy inspectors) must have been for at least 5 years in charge of a mine, in the United States of America. employing fifty or more men underground, to be qualified for such office. He shall receive as full compensation for his services, a salary of Dollars ($) per annum. He shall hold his office for a term of four years (the first term beginning January , 19) unless sooner removed by the Governor, or until his successor is appointed and qualified; and in case of vacancy by death, removal, resignation or otherwise, the Governor shall fill such office, for the remainder of any such term of four years, by appointment.

SEC. 3. DEPUTY INSPECTOR OF MINES.—The office of Deputy Inspector is hereby created. The Inspector of Mines is hereby authorized and directed forthwith, upon the entering of the duties of his office, to appoint ——— Deputy Inspectors, who shall each receive a salary payable at the rate of $——— per annum while holding such office. All Deputy Inspectors appointed under the provisions of this section shall be subject at any time to removal by the Inspector. The Inspector shall also appoint hereafter such additional deputies as the Legislature may provide, who shall, when so appointed by the Legislature, be in all ways subject to the provisions of this section. In case of vacancy in the office of any deputy inspector caused by death, removal or otherwise, the Inspector of Mines shall forthwith fill such vacancy. The qualifications of all deputy inspectors shall be the same as those required in the case of the Inspector of Mines, as set forth in Section 2 of this Act; excepting, however, that such deputy inspectors shall have been for two years in charge of a mine, in the United States of America, employing at least twenty-five men underground. All Deputy Inspectors shall perform duties as required by this Act, and shall be under the direct control and direction of the inspector of Mines. In the absence or disability of the Inspector of Mines, any deputy designated by him may act with like authority as the Inspector of Mines. In the case of a vacancy in the office of the Inspector of Mines, the deputy longest in office present shall act as such Inspector, until such vacancy has been filled.

SEC. 4. QUALIFICATIONS AND POWERS OF INSPECTORS.—No person shall be appointed to the office of Inspector or Deputy Inspector, nor be qualified to hold the office of Inspector or Deputy Inspector, while an employee, director or officer of any mining, milling or smelting company; or while directly or indirectly connected with any mining company or co-partnership operating in this State, either as stockholder, partner, or in any other capacity; or while engaged in private practice as a consulting engineer. The Inspector and each deputy must devote his entire time to the duties of their respective offices; and it shall be unlawful for the Inspector or any deputy to be otherwise employed by the State of ——— or to act directly or indirectly for or on behalf of any candidate for public office, or for any political party,or receive compensation, either directly or indirectly, from any candidate for public office, or from any political party in the State during the terms of such Inspector or Deputy Inspector. Failure to observe the provisions of this section shall render the Inspector liable to immediate removal from office by the Governor

without further cause shown; and such failure shall render any deputy inspector liable to immediate removal by the Inspector of Mines, without further cause shown; and the Governor and Inspector of Mines are hereby authorized and empowered to make removals in such cases.

SEC. 5. SALARY AND EXPENSES.—All reasonable and necessary expenses actually incurred by the Inspector and by any deputy in the performance of their duties, for travelling expenses, clerk-hire, postage, stationery, printing and disbursements incidental and reasonable to the office of Inspector, or of Deputy Inspector, shall be paid by the State Treasurer upon the warrant of the Comptroller* issued upon proper vouchers therefore, when approved by the Inspector of Mines, but such expenses, together with the salaries of the Inspector and his deputies, shall not be incurred in excess of appropriations by the Legislature. The salaries of Inspector of Mines and of all deputy inspectors shall be paid as the salaries of other State officers are paid.

SEC. 6. INSPECTORS SHALL BE ALLOWED ALL LEGAL EXPENSES.—The Inspector may employ counsel to represent him, or any deputy, or to assist in the prosecution of actions or proceedings brought under the provisions of this Act.

In addition to the expenses allowed to the Inspector, as set forth in Section 5 of this Act, he shall be allowed all necessary expenses and reasonable counsel fees actually incurred in enforcing the several provisions of this Act in the respective Courts of this State, and the same shall be paid by the State Treasurer on warrants drawn by the Comptroller* after auditing the same; all such claims and expense accounts shall be presented and passed by the Inspector, and approved by the Court before which such proceedings were instituted. In the event of any costs being finally taxed against the State in any suit in which the State, at the relation of the Inspector is either plaintiff or defendant, the same shall be approved by the Court, and audited and paid in like manner as such legal expenses are authorized to be paid as aforesaid.

SEC. 7. OFFICE AND RECORDS OF INSPECTOR OF MINES.—The Inspector of Mines shall be provided with a properly furnished office in the State House in ——— in which he shall keep a record of all mines in the State, a record of all mines examined either by the inspector or his deputies, showing the dates of such examinations, the condition in which the mines so examined were found, with particular reference to the safety, ventilation and sanitary conditions of each mine so examined, the manner and method of working, all violations of the provisions of this Act found, if any, the action taken thereon, and the result of such action, together with recommendations made in case of each mine examined by the inspector or any deputy; and any other data or information pertaining to his office and acquired during the carrying out of this Act. For the purpose of aiding the Inspector in making up such data it shall be the duty of each deputy to transmit from time to time, or upon request from the Inspector, a complete record of all mine examinations made by such deputy and an itemized statement of his work as such deputy in such form and covering such detail as the Inspector shall, in his opinion, deem necessary.

* Each State will substitute the title of the proper official according to its own system.

All documents, plans, books, memoranda, notes and other material pertaining to the office of the Inspector of Mines, or of any Deputy Inspector, shall be the property of the State, and shall be delivered by the said Inspector, or by such deputy inspectors, to their successors in office. The Inspector may at any time call for all or any papers, documents, plans, books, memoranda, notes or other material in the hands of any deputy, who shall deliver same to said Inspector upon call.

SEC. 8. REPORTS TO INSPECTOR OF MINES.—It is hereby made the duty of the operator of each and every mine within the State to forward to the Inspector at his office, not later than the 20th day of January in each year, a detailed report in writing, on a form prescribed by the Inspector, showing the character of the mine, tonnage of ore produced during the previous year, ending December 31st, the average number of men therein employed during the year (the average number of men employed being computed by dividing the total number of shifts worked per man by the number of days the mine was worked), the number of days the mine was worked, the number of fatal and serious accidents during the year, and such other information relative to the workings, equipment, ventilation, sanitation, means of ingress and egress, shafts, trucking, supports, safety devices, storage of explosives, means taken to protect lives and usual safety of men in relation to any of the requirements of this Act, as the Inspector may, from time to time require. All such reports shall be filed in and become part of the records of the office of the Inspector of Mines. Blank forms for such reports shall be furnished by the State.

Provided, however, that in the case of any mine being operated for less than one year prior to December 31st in any year, the operator in such event shall forward a report, in like manner, covering the period during which said mine was operated, and

Provided further, that in the event of the sale or lease of any mine during any year prior to December 31st, that then and in that event it shall be the duty of the owner or operator so selling, leasing or turning over such mine to a succeeding operator to supply to such succeeding operator a like report, as required in this section, covering the period of such former operations within said year; and it shall then and in that event become the duty of such succeeding operator to forward such report so turned over, together with said succeeding operator's report, for the period of said succeeding operator's operations, to the Inspector of Mines as aforesaid, not later than the 20th day of January in each year.

In all cases, occurring in or about any mine, of underground fires, breakage of ropes or other gear by which men are hoisted, or lowered, overwinding while men are being hoisted, or inrush of water from old workings, whether or not personal injury or disablement results, a report thereof, signed by the operator or superintendent, must immediately be sent in writing to the Inspector.

A failure, neglect or refusal to make such reports or to give such information as are provided for in this Section, upon demand made in writing by the Inspector, or by any of his deputy inspectors, shall constitute a misdemeanor, and every such operator, or person in charge of such mine, or other person so failing, neglecting or refusing after written demand made as aforesaid shall be deemed guilty of a misdemeanor, and

on conviction shall be fined for each offence not less than fifty dollars or more than two hundred dollars; and each separate failure, neglect or refusal after demand, as aforesaid, shall constitute a separate offense.

SEC. 9. DESIGNATION FOR SERVICE OF NOTICES.—Every operator of any mine within the provisions of this Act, shall, within sixty days after the passage of this Act, file or cause to be filed in the principal office of the Inspector of Mines a designation, duly verified, by such operator, designating a person upon whom all notices, warnings or processes, required to be served under the provisions of this Act, may be served in this State. The person so designated must have an office, place of employment or place of business within ten miles of the principal place of business of such operator within the State, and such designation shall give the office, place of employment or place of business of such person so designated. Such designation shall be accompanied by the written consent of the person so designated, and shall continue in force until revoked by the death or removal of the person so designated, or until revoked by an instrument in writing designating in like manner some other person upon whom such notices or processes may be served, or until the filing in such office of a written revocation of said consent executed by the person so designated. If the person so designated dies or removes beyond ten miles of the place of business of such operator, or files a revocation of his consent, the operator must, within thirty days thereafter, designate in like manner some other person upon whom such notices or processes may be served within this State.

Services upon such designated persons of notices, warnings or processes shall, in all cases arising under this Act, be deemed service upon such operator;

Provided, however, that nothing herein contained shall be construed to prevent the said operator in person, or its officers or agents, if said operator be a corporation, or any employee of such operator, from being so designated. A failure on the part of any operator to carry out the provisions of this section shall be deemed a violation of this Act.

SEC. 10. SECRECY OF RECORDS.—The inspector or any deputy inspector, or any person employed by such inspector or deputy inspector, or any person having access to the papers filed in the office of said inspector or in the office of any deputy inspector, shall not make public or reveal to any person or persons either orally or in writing, all or any part of the contents of any report, complaint or document filed in the office of the Inspector of Mines of this State, or in the office of any of his deputy inspectors, or reveal or make public to any person or persons any knowledge or information in regard to the safety or physical or financial condition of any mine, mining rights, prospect or mining company or concern obtained by any of the aforesaid inspector, deputy inspectors or employees while in the exercise of his or their official duties. Nothing herein concontained, however, shall be construed to prevent any inspector or deputy inspector, or any clerk, or employee of such inspector or deputy inspector from making official reports to the Governor or Legislature of this State, to the inspector of mines, or to any deputy inspector, or from giving evidence in any Court of Justice in this State in discharge of his official duty. An inspector of mines, or any deputy inspector of mines, or any

employee or clerk who violates any of the provisions of this section of this Act, shall be guilty of a misdemeanour and shall be punished upon conviction by a fine of not more than $500, or by imprisonment of not more than one year, or both; and shall also be dismissed from his office or employment.

SEC. 11. DUTIES OF INSPECTORS—INSPECTION—POWERS.—It shall be the duty of the Inspector of Mines, by himself or by deputy, to visit at least once every two months every mine in the State employing 50 or more men underground; and every other mine at least once every year and oftener if, in his opinion, the safety of the men employed within the mine so requires; and to inspect, inquire and examine into the operation, workings, timbering, safety appliances, machinery, sanitation, ventilation, means of ingress and egress, means taken to protect the lives and insure the safety of the miners, together with the cause of accidents and accidental death therein, and in general, to inspect and ascertain what means are taken to comply with the provisions of this Act. For the purpose of making such inspection and ascertaining facts in connection with such examination and inquiry, the inspector, or his deputy, shall have full power and authority at all hours to enter and examine any part of any mine or mining plant within this State, or any part of the workings thereof. All operators and their employees shall render to the Inspector or his deputy, such assistance as may be necessary to enable the Inspector or his deputy to make such examination.

For the purpose of ascertaining facts in connection with any inspection, inquiry or examination, the said Inspector, or any deputy, shall have full power to compel the attendance of witnesses by subpœna, and to take depositions, to administer oaths and to examine, cross-examine and take testimony of such persons as may be deemed necessary for the information of the Inspector or his deputies. Any person refusing to obey a subpœna issued by the Inspector, or by any deputy, or any person who shall wilfully in any manner hinder or obstruct the Inspector or any of his deputies in the performance of his or any of their duties, under this Act, shall be guilty of a misdemeanour. Any witness appearing before the Inspector, or before any of his deputies, in response to a subpœna so issue who shall knowingly and wilfully testify falsely to any material matter, shall be deemed guilty of perjury, and upon conviction as by law provided, shall be punished for perjury.

SEC. 12. DANGEROUS MINES—DUTIES OF INSPECTORS.—Whenever the inspector shall find any mine, or part of any mine, in an unsafe condition, by reason of any violation of any of the rules or provisions of this Act, or in a condition dangerous or detrimental to the life or health of those employed therein, for the same reason or by reason of defects in timbering, mining, ventilation, or sanitation, it shall be the duty of the inspector at once to serve or cause to be served a notice in writing upon the operator of such mine, and such notice shall set forth in detail the nature and extent of the defects which render the mine or part of the mine unsafe, dangerous, or detrimental to the life or health of those employed therein, together with the point or place in the mine, or in the workings of the mine, where such defects exist, and such notice shall require such necessary changes to be made in such mine or part of the mine without

delay and within a specified time in the discretion of the inspector, to make the same conform to the provisions of this Act.

If it appears from a re-examination of the mine by the inspector, or a deputy inspector, that such necessary changes have not been made within the time specified in such notice, and that the mine or part of the mine is still in a condition dangerous to life or health, and in the opinion of the inspector it is necessary for the safety of the life or health of the employees in such mine or part of the mine, that the same be vacated, it shall be the duty of the inspector forthwith to institute an action for an injunction in any court of competent jurisdiction, in the name of the State, at the relation of the inspector, to restrain the operation and working of said mine, or part of said mine, and the permitting of employees therein for purposes other than to remedy the defects complained of, until the provisions of this law are complied with, and the said mine, or part of the mine, made safe for the employees therein; and the plaintiff in such action, without bond, and upon *ex parte* affidavits made by the inspector or a deputy inspector, showing in detail the nature and extent of the defects which, in such affiant's opinion, render the mine or part of the mine, unsafe or detrimental to life or health of those employed therein, and stating that such mine, or part of the mine, is, in the opinion of the affiant, in a condition dangerous to life or health, may procure a temporary injunction, pending the trial of said action, from any court or judge in vacation, if, in the opinion of the court or the judge, the facts warrant the granting of such temporary injunction, enjoining the operation and working of said mine, or part of said mine, and the permitting of employees therein, except for the purpose of remedying the defects complained of, until the further order of the Court.

Provided, however, that the defendants in such actions shall have the same opportunity to be heard, upon motion to vacate such temporary injunctions, as defendants have in any actions brought in this State in which temporary injunctive relief may be granted.

SEC. 13. REFUSING INSPECTION. PENALTY.—If the operator of any mine within the State shall fail, impede or refuse to permit such inspection, as is provided in Sections 11 and 12 of this Act, the inspector or deputy may file his affidavit setting forth such refusal before the judge of the Court in the County in which said mine is situated, either during the term of the Court or during vacation, and obtain an order directed to such operator, so refusing as aforesaid, commanding him to permit and furnish all necessary facilities for the entering, examination or inspection of such mine, or to be adjudged to stand in contempt of Court and punished accordingly.

SEC. 14. RECORDS OF INSPECTION.—It shall be the duty of the inspector, or any deputy, after every inspection made of any mine or parts of any mine, as provided in this Act, to enter forthwith in a book to be kept at the mine, and designated as the "Record of Inspection," the portions of the mine so inspected, the nature of such inspection, and every illegal defect observed in the state and condition of the mine, machinery and appliances; but nothing contained in or omitted from such entry shall limit or affect the duty and obligation of the owner or operator of

such mine under this Act. Such "Record of Inspection" shall be open at all reasonable times to the examination of the inspector, or any of his deputies, or to the examination of any persons employed in the mine.

SEC. 15. COMPLAINTS to INSPECTORS.—Whenever the inspector receives a complaint in writing, signed by three or more persons employed in a mine, setting forth that the mine in which they are working is being operated contrary to law, and is dangerous in any respect to the health or lives of those employed therein, the inspector must in person, or by deputy, examine such mine as soon as possible. The names of the persons making such complaint shall be kept secret by the inspector, unless permission to disclose them be expressly granted by the persons making the complaint. *Provided, however*, that such complaint shall, in all cases, set forth the alleged violation of law observed, the nature of the danger existing at the mine, and the time when such violation and danger were first observed. If, after such inspection, the inspector finds the conditions in his opinion, dangerous to the health and lives of those employed therein, by reason of any violation of any of the provisions and rules of this Act, he shall serve, or cause to be served, a notice setting forth fully the facts upon which his opinion is based, upon the operator or any person having charge of such mine, as provided in Section 12 of this Act, and shall thereafter take such steps to remedy such danger and to compel compliance with the rules and provisions of this Act as the inspector could take in any case arising under Section 12 of this Act.

It shall be the duty of the inspector or any deputy to forward every such original complaint, so received, to the office of the Inspector of Mines, where it shall be indexed and filed among the official papers of the Inspector of Mines.

SEC. 16. ACCIDENTS.—Whenever a serious accident occurs in or about any mine, notice thereof shall be given promptly, in writing, to the inspector by the superintendent or other person having immediate charge of the work at the time of the accident. The words "serious accident" shall be construed to mean, for the purposes of this Act, accidents resulting in such injuries as, in the opinion of an accredited physician, may result in the injured person being incapacitated from work for at least fourteen days. Upon receiving such notice the inspector, or a deputy, shall, if feasible, and if the nature of the accident shows it to be necessary, proceed to the scene of the accident with all convenient speed and investigate fully the cause of the accident, and shall file the result of such investigation as a report in the office of the inspector, within twenty days thereafter. Whenever the inspector, or a deputy, cannot proceed as above to the scene of the accident, the person in charge of the mine shall be so informed by the inspector, and such person in charge must secure sworn statements of those who witnessed the accident, or if no one were present at the time of such accident, he must secure the sworn statement of those first arriving upon the scene; such statements must give, as far as possible the details of the accident, the facts leading up to it and its probable cause; such sworn statements shall immediately thereafter be sent to the inspector, who shall file same in his office, as a public record.

SEC. 17. LOSS OF LIFE.—Whenever loss of life occurs from accident in or about a mine, and when death results from personal injury, the

superintendent or other person having immediate charge of the work at the time of the accident shall give notice to the inspector, promptly after knowledge of death comes. Whenever possible, the inspector or a deputy shall be present at every coroner's inquest held over the remains of a person killed in or about a mine. An inquest held by the coroner upon the body of a person so killed shall be adjourned by the coroner for not more than days at the request of the inspector. If the inspector or any of his deputies are not present at such inquest, the coroner in such case shall notify the inspector or his deputy intending to be present, in writing, of such adjourned inquest, and the time and place of holding the same at least five days previous thereto. Due notice of an intended inquest to be held by the coroner shall be given by the coroner to the inspector, and at such inquest the inspector and any deputy inspector shall have the right to examine and cross-examine witnesses, and such examination shall be part of the records of such inquest. If, at any inquest held over the body or bodies of persons whose death was caused by an accident in or about the mine, the inspector or any deputy be not present, and it is found from the evidence given at the inquest that the accident was caused by neglect or by any defect in or about the mine, or because the mine was operated contrary to the provisions of this Act, the coroner shall send notice in writing to said inspector of such reported neglect or default; and the said inspector shall immediately take steps to have an investigation made of the same. The coroner before whom such an inquest is held shall promptly file with the inspector of mines a copy of the testimony taken thereat and a copy of the verdict rendered by the coroner's jury.

SEC. 18. INSPECTOR TO FORWARD PAPERS TO PROSECUTING OFFICER IN CERTAIN CASES.—Whenever, in the opinion of the inspector of mines, a serious or fatal accident, in or about any mine in this State, shall have been caused by failure on the part of the operator or any employee of such mine, or by any other person or by any of them, to observe the provisions of this Act, it shall be the duty of such inspector to cause a copy of the report of such accident, or a copy of the testimony taken at the coroner's inquest together with the verdict of the coroner's jury, and all papers in his hands relating thereto, to be forwarded to the prosecuting officer of the County in which the accident or loss of life occurred, together with an accompanying statement of the inspector, showing in what particular or particulars he believes the law to have been violated and if upon the receipt thereof the Prosecuting Officer of the said County deems the facts to make a prima facie cause of action against any party, he shall present such evidence to the Grand Jury and take such further steps for the criminal prosecution of such operators, employees, or other person, as may seem advisable.

SEC. 19. STATISTICAL REPORTS OF MINE INSPECTOR.—It shall be the duty of the inspector of mines within three months after January 1st in each year, to make a report directed to the Governor and Legislature of this State, giving a statistical summary and report of the work of the inspector and deputy inspectors of mines during the previous year ending December 31st. Such report shall contain a statement showing the number of men employed in each mine in the State, stating separately

the number of men employed above ground and underground, the number and nature of fatal and serious accidents occurring in each mine, the number of inspections made, complaints filed, inquests attended, mines ordered to be vacated, violations found and any other information deemed important and relevant by the inspector of mines, together with such recommendations as in the judgment of the inspector of mines are necessary or desirable to the carrying out of this Act and to insure the safety of the workmen employed within the mines, subject to the provisions of this Act. Copies of such report shall be published and distributed by and at the expense of the State as a public document.

SEC. 20. REMOVAL OF INSPECTORS AND DEPUTY INSPECTORS.—Upon a petition signed by at least 100 miners, or 10 operators, or by three operators each employing 100 men underground, setting forth that the inspector, or any deputy, neglects his duties as prescribed in this Act, or that he is incompetent, and unqualified for the office of inspector, or deputy, as the case may be, under this Act, or guilty of malfeasance in office, or guilty of any unlawful act tending to the injury of miners or the operators of mines, it shall be the duty of the Court of of the County wherein such inspector or deputy inspector resides, to issue a citation in the name of the State to the said inspector, or said deputy inspector, to appear upon not less than fifteen days' notice, on a day fixed, before said Court, and the Court shall then proceed to inquire into and investigate the allegations of the petitioners. If the Court shall find that said inspector, or deputy inspector, so petitioned against, is neglectful of his duties, as prescribed in this Act, or that he is not qualified under the provisions of this Act for such office, or that he is incompetent to perform the duties of his office, or that he is guilty of malfeasance in office, the Court so finding any or all of such facts, shall certify the facts so found to the Governor of the State, in the case of such finding against an inspector, and to the inspector of mines, in the case of such finding against a deputy inspector, and the Governor or inspector, as the case may be, shall declare the office of inspector or such deputy inspector vacant, and steps shall forthwith then be taken to appoint a properly qualified person to fill such vacant office of inspector or deputy inspector, as the case may be, for the remainder of the unfilled term of the removed official.

The cost of said investigation shall be borne by the removed inspector or deputy inspector; but if the allegations in the petition are not sustained, the costs shall be paid by the petitioners.

SEC. 21. CARE OF INJURED.—It shall be the duty of operators, superintendents or any one in charge of any mine where ten or more men are employed, to keep at the mouth of the drift, shaft or stope, or at such other place about the mine as may be designated by the inspector, a stretcher and a woolen and waterproof blanket, in good condition, for use in carrying any person who may be injured at the mine. Where more than two hundred persons are employed, two stretchers and two woolen and waterproof blankets shall be kept. And at all mines a supply of antiseptic gauze, carbolated vaseline, sponges, soap, carbolic acid, tablets of bichloride of mercury, linseed oil, bandages, suitable towels and a wash basin shall be kept readily accessible for the treatment of anyone injured. *Provided*, that in all mines where five hundred or more men are employed,

a First Aid Corps must be organized, consisting of the foreman or foremen, shift-bosses, time-keepers and other employees, designated by the superintendent; and it shall be the duty of the operator or superintendent of the mine to cause the organization of such; and to procure the services of a competent surgeon or physician to instruct the members of such First Aid Corps from time to time, not less than once in each calendar year, in the proper handling and treatment of injured persons before the arrival of a physician.

SEC. 22. MINE MAPS.—The operator of every mine, employing ten or more men underground, shall make and maintain, or cause to be made and maintained, by a competent mining engineer or surveyor, an accurate map of the workings of such mine. At least once in every six months, or oftener, if necessary, the operator or superintendent of each mine shall cause to be shown accurately on the map of said mine, all the excavations made therein during the time elapsed since such excavations were last shown on said map, and all parts of said mine, which were worked out or abandoned during said elapsed period of time shall be clearly indicated on said map, and all underground workings shall be surveyed and mapped before they are allowed to become inaccessible. Such maps shall, at all times, be open to the examination of the inspector of mines or any of his deputies.

SEC. 23. FAILURE TO MAKE MAP. REMEDY.—Whenever any operator of any mine employing more than ten men underground, shall neglect or refuse to make such map of the workings of any such mine, for a period of three months after the receipt of written notice so to do by the inspector, or by any deputy, or fails at least once in every six months to add or cause to be added to such map all excavations made within said period, then and in either of such events the inspector is hereby authorized to cause a correct survey and map of such mine to be made at the expense of the operator thereof, the cost of which shall be recoverable at law from said operator as other debts are recoverable by law. The amount advanced by the inspector for making any map, as provided in this section, shall be considered as part of the expense of his office and shall be paid as such.

SEC. 24. STORAGE OF INFLAMMABLE MATERIAL.—It shall be the duty of the operator of each mine to store, or cause to be stored, oils and other dangerously inflammable materials in a covered building, kept solely for such storage, which building shall be at least 100 feet from any other building and at least 300 feet from any powder magazine. The man in charge of such building, who shall be the superintendent, or a person expressly designated by him, shall permit only sufficient oil or other inflammable material to be taken from such building to meet the requirements of one day. If any oil or gasolene storage be so situated that leakage would permit the oil or gasolene to flow within the above specified distance, means to prevent such flow must be provided.

SEC. 25. STORAGE OF EXPLOSIVES.—No blasting powder or any high explosive containing nitro-glycerine shall be stored in any mine. *Provided*, that nothing in this section shall be construed to prevent the operator of any mine from keeping sufficient blasting powder or other

high explosive within such mine to meet the estimated requirements of such mine during the succeeding twenty-four hours; and *Provided further*, that such temporary supply shall not be kept at any place within such mine, where its accidental discharge would cut off the escape of miners working therein.

All blasting powder, or other high explosive, in excess of the temporary supply required in such mine shall be stored in a magazine placed not less than three hundred feet distant from any shaft, adit, habitation, public highway, public railway, or from the boundary line of any mining property; *Provided, however*, that in cases where the location of any mining property makes it impossible to comply with the provisions of this section, the inspector may grant permission in writing to the operator of such mining property to place such magazine in some other place on such mining property, if, in the opinion of the said inspector such location shall not be dangerous to the safety of those employed within such mine.

Every magazine where powder or other high explosive is stored as provided in this section, shall be ventilated; and if it be a building above the surface of the ground it shall be provided with a lightning conductor supported on a vertical post standing clear of such magazine, and not nearer than eighteen inches from one of the walls thereof and rising at least six feet above the highest point of such magazine; such lightning conductor shall be carried to a properly laid earth plate, set in the ground at a depth below the permanent moisture line of the ground and at a distance of at least one foot outside of the foundation walls of said magazine.

It shall be the duty of the operator to enforce the carrying out of this section and any failure on the part of said operator so to do shall be deemed a violation of this Act.

SEC. 26. MARKING OF EXPLOSIVES.—It shall be unlawful for the operator or superintendent of any mine to permit the use within such mine of any explosive containing nitro-glycerine unless there shall be plainly printed or marked, in the English language, on every original package containing such explosive the name and place of business of the manufacturer of such explosive, together with the date of its manufacture.

SEC. 27. SUPERINTENDENT TO BE APPOINTED.—The operator of every mine, within the provisions of this Act, shall appoint a man who shall be personally in charge of the mine and the carrying out of the work done therein, who shall be designated as the "Superintendent"; *Provided, however*, that nothing herein contained shall prevent the owner or operator of any mine from personally filling the office of "Superintendent."

The superintendent of every mine shall inspect or cause an inspection to be made by some competent person or persons appointed by him, of all mining appliances, boilers, engines, magazines, shafts, shaft houses, underground workings, roofs, pillars, timbers, explosives, bell ropes, speaking tubes, telephones, tracks, ladders, dry closets and all parts and appliances of said mine in actual use, and any such person or persons appointed by the said superintendent shall at once report any defects therein to the superintendent. It shall be the duty of the superintendent upon ascertaining any such defects to take immediate steps to remedy the same so as to make the same comply with the provisions of this Act; and he shall, forthwith, notify the operator of said mine of the existence of

such defects. It shall be the duty of the superintendent to appoint a competent man to have full charge, under the direction of said superintendent, of every magazine containing explosives situated on such mining property; and to make such other appointments and perform such other duties as are provided by this Act to be performed by such superintendent.

SEC. 28. MINE FOREMAN. APPOINTMENT.—The superintendent of every mine, within the provisions of this Act, shall appoint a man who shall be personally in charge of the carrying out of the underground workings of the mine, and who shall personally direct the work of the men employed underground therein, who shall be designated as the "Mine Foreman"; provided, however, that nothing herein contained shall be construed to prevent the superintendent of any mine from also filling the position of Mine Foreman. No person shall be appointed to the position of Mine Foreman who shall not be at least 21 years of age, and shall not have had at least two years of practical experience as an underground miner in metalliferous mines, and who shall not be able readily to read and write the English language. Any superintendent failing to make such appointment of Mine Foreman, or neglecting or failing immediately to appoint another in his place, in the event of said Mine Foreman vacating or losing his position from any cause, shall be guilty of a misdemeanour. Such appointment shall be made in writing, and it shall be the duty of such superintendent to keep posted notice of such appointment or reappointment, immediately after the same shall have been made, in at least two conspicuous places about said mine, and notices of such appointment, or any reappointment, shall be mailed immediately thereafter to the inspector of mines.

SEC. 29. DUTIES OF MINE FOREMAN.—The Mine Foreman shall attend personally to his duties in the mine, as provided in this Act, and shall see that the regulations provided herein for securing the safety of all men employed in such mine are carried out; he shall immediately report to the superintendent of the mine, or in the absence of the superintendent to the mine operator, any violations or infringements of this Act observed by him within the mine, and shall take immediate steps to remedy the same. He shall warn all employees of danger to life or limb observed by him within the mine, and permit no person to work in an unsafe place unless for the purpose of making it safe; and shall supervise the miners in the carrying out of their work.

SEC. 30. BLASTING.—Gang bosses shall be in immediate charge, and responsible for blasting within the mine. It shall be their duty to see that no iron or steel tools shall be used for tamping, and all miners are hereby forbidden to use iron or steel tools for such purposes under penalty of a misdemeanour. It shall be the duty of the Mine Foreman to fix the time of all blasting and firing. Gang bosses and miners about to fire shots shall cause warnings to be given in every direction, and all entrances to the place or places where charges are to be fired shall be guarded while such firing is going on. Failure on the part of gang bosses or miners to comply with the provisions of this section shall be deemed a violation of this Act. The number of shots exploding, except in cases of electric firing, shall be counted by the miner firing same. If said miner be not

certain that all the shots have exploded, no one shall be permitted to enter the places where such charges were placed, for a period of thirty minutes after the fuses were lighted. Such misfire, occurring at change of any shift shall be reported to the Mine Foreman, Shift Boss and to the miner of the following shift.

In the event of shots fired by electricity, then it shall be unlawful for any person knowingly to enter the vicinity of the mine where such shots are fired, until the cable of the firing battery has been disconnected; it shall be the duty of the gang boss or miner in charge of the shot-firing to see that all such cables are disconnected immediately after such firing, and to examine, or direct the examination of such place where shots are fired, before any men are permitted to work therein. All miners shall immediately report to the Gang Boss, Shift Boss or Mine Foreman the finding of any loose wires under or in the rock loosened by such firing; and in such event the Mine Foreman, or in his absence the Shift Boss, or Gang Boss, shall at once order work to cease until such wires have been traced to their terminals. It shall be the duty of the Mine Foreman to see that no current of higher than 250 volts shall be used when firing electricity.

It shall be unlawful for any miner to extract or attempt to extract explosives from a hole which has once been charged, but in every such case a fresh charge shall be inserted above the missed explosive, and the same shall be then detonated. It shall be unlawful for any miner to deepen holes, or any part of holes, left standing or abandoned, and theretofore charged with explosives.

SEC. 31. HOISTING ENGINEER.—It shall be the duty of every superintendent of every mine having a hoisting engine to appoint and designate one or more men, who shall be able to speak and read the English language readily, to be known as hoisting engineers. At all shafts where men are hoisted or lowered such hoisting engineers shall be not less than twenty-one years of age, and at shafts where men are not so hoisted or lowered they shall be not less than eighteen years of age. It shall be the duty of every superintendent to appoint as hoisting engineers men who are familiar with the details and working of a hoisting engine, and to permit no one, other than such duly appointed hoisting engineers, to run such engine or hoisting machinery, except that by and with the consent of the Superintendent, specified apprentices may be taught the operation of the hoisting engine at such times and under such restrictions as the Superintendent may determine to be free of risk to life and limb. Any superintendent failing to make such appointment of hoisting engineer, or knowingly appointing any hoisting engineer not qualified as above, shall be guilty of a violation of this Act.

SEC. 32. DUTIES OF HOISTING ENGINEER.—The following rules shall be observed by every hoisting engineer employed within this State:

Rule 1. It shall be the duty of every hoisting engineer to keep a careful watch over his engine and over all machinery under his charge.

Rule 2. He shall at all times be in immediate charge of his engine, and shall not at any time delegate any of his duties to any other person, except to apprentices, duly designated as provided in this Act; provided, however, nothing herein contained shall be construed to prevent any

hoisting engineer delegating to or sharing his duties with any other duly appointed hoisting engineer, or turning over the engine and machinery in his charge to any other such engineer at the end of his shift.

Rule 3. He shall familiarize himself with and use all signal codes for hoisting and lowering as directed to be used in this Act.

Rule 4. He shall not run his engine unless the same is properly provided with adequate brakes, indicators, and distance marks on hoisting ropes or cables, as provided in this Act.

Rule 5. It shall be the duty of the hoisting engineer to exclude every person from his engine room, excepting any person or persons whose duties require their presence therein, and visitors authorized by the superintendent of the mine.

Rule 6. He shall hold no conversation with anyone while his engine is in motion, or while attending to signals.

Rule 7. He must run his engine with extreme caution, whenever men are on the hoisting cage.

Rule 8. He shall not hoist men out of, or lower men into, any mine or shaft at a speed greater than 800 feet per minute.

Rule 9. He shall inspect all hoisting machinery and safety appliances connected therewith, and all ropes and hoisting apparatus, when and as directed by the mine superintendent, and shall report to him any defects found therein.

Rule 10. After any stoppage of hoisting for repairs or for any other purpose exceeding in duration one hour, he shall run a cage or other conveyance, unloaded, up and down the working portion of the shaft, at least once, and shall not permit the cage or other conveyance to be used until the hoisting machinery and shaft are found to be in safe condition.

Rule 11. He shall do no hoisting in any compartment of a shaft while repairs are being made in the said hoisting compartment, excepting such hoisting as may be necessary to make such repairs.

Rule 12. He shall familiarize himself with and carry out the requirements of Rules 7, 8, 9, 10, 11, 12, 19 and 20 of Section 37 of this Act.

Rule 13. Any hoisting engineer or any person having in charge the hoisting machinery connected with the mine who shall wilfully violate any of the provisions of this section, or any of the rules contained therein, or who shall wilfully violate any of the provisions of rules 7, 8, 9, 10, 11, 12, 19 and 20 of Section 37 of this Act shall, upon conviction, be deemed guilty of a violation of this Act, and liable to punishment accordingly.

Rule 14. The superintendent shall post a copy of this Section and the last preceding section in a conspicuous place on the door of the engine house.

SEC. 33. HOISTING ROPES.—It shall be unlawful to use in any mine, included within the provisions of this Act, any rope or cable for hoisting or lowering either men or material, when such hoisting or lowering is done by any means other than human or animal power, unless such rope or cable be composed of iron or steel wires, with a factor of safety determined as hereinafter set forth, *Provided, however*, that such iron or steel wires may be laid around a hemp centre.

The factor of safety of all such ropes or cables shall in no case be less than five, and shall be calculated by dividing the breaking strength of the rope as given in the manufacturers' published tables, by the sum of the maximum load to be hoisted, plus the total weight of the rope in the shaft when fully let out, plus 10 per cent. of such values, to take account of shock at starting and stopping.

It shall be unlawful to use any rope or cable for the raising or lowering of men, either when the number of breaks in any running foot of said rope exceeds ten per cent. of the total number of wires composing the rope, or when the wires on the crown of the strands are worn down to less than one-half their original diameter, or when the superficial inspection provided for in this section shows marked signs of corrosion.

All ropes must be superficially inspected once in every twenty-four hours by some competent person designated for that purpose by the superintendent, and it shall be the duty of the superintendent to cause an examination to be made once in every succeeding three months of a section of such rope or cable, then in use for hoisting and lowering men and materials in such mine. If upon any inspection such hoisting rope or cable is found to be below the requirements set forth in this section, it shall be disused for such purpose forthwith, and any operator or superintendent using or permitting the use of such hoisting rope or cable for the purpose of hoisting or lowering men thereafter, shall be guilty of an offence against this Act.

SEC. 34. CAGES FOR HOISTING MEN.—It shall be unlawful for the operator of any mine to permit the hoisting or lowering of men through a vertical shaft deeper than 300 feet, unless an iron-bonneted safety cage be used for hoisting and lowering of such men, but this provision shall not apply to shafts in process of sinking.

It shall be the duty of the operator to have all cages used in such shafts, over three hundred feet deep, and in which men are hoisted and lowered, to be constructed as follows: The bonnet shall be of two steel plates, 3-16 inch in thickness, sloping toward each side, and so arranged that they may be readily pushed upward to afford egress to persons therein, and such bonnet must cover the top of the cage in such a manner as to protect those on the cage from objects falling in the shaft. The cage shall be provided with sheet iron or steel side casing, not less than $\frac{1}{8}$ inch thick, or with a netting composed of wire not less than $\frac{1}{8}$ inch in diameter, and with doors made of the same material as the side casing, either hung on hinges or working in slides. These doors shall extend at least 4 feet above the bottom of the cage and must be closed when lowering or hoisting men, except timbermen riding on the cage to attend to timbers that are being lowered or hoisted. Every cage must have overhead bars of such arrangement as to give every man on the cage an easy and secure hand-hold. Every cage or skip used for hoisting men must be provided with a safety catch of sufficient strength to hold the cage or skip with its maximum load at any point in the shaft in the event that the hoisting cable should break. The inspector or his deputy must see that all cages and skips are equipped in compliance with this paragraph, and that on all cages the safety catches are kept well oiled and in good working condition.

Any operator of any mine failing to comply with the provisions of this Section, within ninety days after its passage, shall be guilty of an offence against this Act.

SEC. 35. BOILERS AND CONNECTIONS, MACHINERY, ETC., INSPECTION. —All boilers used for generating steam in and about mines shall be kept in good order, and the owner, operator or superintendent shall have them examined and inspected by a qualified person, not an employee of said operator, as often as once in six months, and oftener if the inspector or his deputy shall deem it necessary. The result of such examination, under oath of the person making such examination, shall be certified in writing to the inspector within thirty (30) days thereafter.

It shall be the duty of the operator to provide each battery of boilers with a safety valve of sufficient area for the steam to escape and with weights or springs properly adjusted; and to provide every boiler house with a steam gauge properly connected with the boilers, to indicate the steam pressure, and another steam gauge shall be attached to the steam pipe in the engine house. All steam gauges shall be placed in such position that the engineer or fireman can readily examine them and see what pressure is carried. All steam gauges shall be kept in good order, and shall be tested and adjusted as often as once in every six months and their condition reported to the inspector in the same manner as the report of boiler inspection.

All machinery used in or about the mine, such as engines, wheels, screens, shafting and belting shall be protected by covering or railing so as to prevent persons from inadvertently walking against or falling upon the same. The sides of stairs, trestles and dangerous plank walks in and around the mines shall be provided with hand and guard railing to prevent persons from falling over the sides. This section shall not forbid the temporary removal of a fence, guard rail or covering for the purpose of repairs or other operations, if proper precautions are used, and the fence, guard rail or covering is replaced immediately thereafter. It shall be the duty of the operator to carry out the foregoing provisions of this section, and failure to comply with the provisions of this section shall be deemed an offence against this Act.

SEC. 36. PROHIBITED EMPLOYMENT OF WOMEN AND CHILDREN IN MINES.—No woman or girl, and no boy under the age of sixteen years, shall be employed or permitted to work within any mine within this State, included in the provisions of this Act; and it shall be unlawful for any operator to employ such persons within such mine. Before any boy shall be permitted to work in any mine he must produce to the operator, superintendent or mine foreman thereof, an affidavit made by the parent, guardian or next of kin of said boy, duly verified, containing a statement that he, the said boy, is at least sixteen years of age.

Any person who violates and does not comply with the provisions of this Section is guilty of an offence against this Act.

Provided, however, that nothing in this Section contained shall be construed to prevent the employment of women, or children under sixteen years, in clerical or office positions in the offices or buildings connected with such mine.

SEC. 37. RULES

The following general rules shall be observed in and about every mine within this State to which this Act applies.

Additional Duties of Mine Foreman and Assistant Mine Foreman

Rule 1. The operator and superintendent of every mine shall use every precaution to insure the safety of the workmen in the mine in all cases, whether provided for in this Act or not, and shall place the underground workings thereof and all that is related to the same under the charge and daily supervision of a competent person who shall be called "Mine Foreman."

Rule 2. Whenever a mine foreman cannot personally carry out the provisions of this Act, so far as they pertain to him, the superintendent shall authorize him to employ a sufficient number of competent persons to act as his assistants, who shall be subject to his orders, and shall be known as "Assistant Mine Foremen," and they shall be under the direct supervision of the mine foreman and shall carry on the duties of the mine foreman as directed by him, and as prescribed in Section 29 of this Act.

Rule 3. The mine foreman shall have charge of carrying out or directing the carrying out of his duties as prescribed in Section 29 of this Act; and any Superintendent who shall direct or cause a mine foreman to disregard the provisions of this Act shall be amenable in the same manner as the mine foreman.

Rule 4. The mine foreman shall see that all dangerous places are properly fenced off and proper danger signal boards are so hung on such fencings that they may be plainly seen.

Candles

Rule 5. No candle shall be left burning in a mine or any part of a mine when the person using the candle departs from his work for the day.

Fire Fighting Helmets

Rule 6. The operator or superintendent of a mine employing more than 50 men underground shall provide, and keep in a readily accessible place, at least two fire fighting helmets to be used in case of emergency.

Cages

Rule 7. At all mines where hoisting is done by cage or skips from two or more levels a man shall be employed whose duties shall be to load and unload the cage or skip and to give all signals to the hoisting engineer. The superintendent is responsible for the enforcement of this rule.

Rule 8. Any person riding upon any cage, skip or bucket that is loaded with tools, timber, powder or other material, except for the purpose of assisting in passing such material through a shaft or incline, and then only after a special signal has been given, shall be guilty of a violation of this Act.

Rule 9. When tools, timber or other materials are to be lowered or hoisted in a shaft, their ends, if projecting above the top of the bucket, skip or other vehicle, shall be securely fastened to the hoisting rope or to

the upper part of the vehicle, and all tools, timber or other materials loaded upon a cage must be securely lashed before being lowered or hoisted.

Hoisting while Shaft-Sinking

Rule 10. In no case shall a cage, skip or bucket or other vehicle be lowered directly to the bottom of the shaft when men are working there, but such cage, skip or bucket or other vehicle must be stopped at least fifteen feet above the bottom of such shaft until the signal to lower further has been given to the hoisting engineer by one of the men at the bottom of the shaft, *provided, however*, that this rule shall not apply to shafts of less than fifty feet in depth.

Deepening Shaft—Protection

Rule 11. Persons engaged in deepening a shaft in which hoisting from an upper level is going on shall be protected from the danger of falling material by a suitable covering extending over the whole area of the shaft, sufficient openings being left in the covering for the passage of men, a bucket or other conveyance used in sinking operations. It shall be the duty of the superintendent of the mine to enforce this rule, and failure so to do shall be deemed a violation of this Act.

Rule 12. No hoisting shall be done in any compartment of a shaft while repairs are being made in that compartment, excepting such hoisting as is necessary in order to make such repairs.

Rule 13. Whims in use at or in mines shall be provided with a suitable stopper, or some other reliable device, to prevent running back of the bucket or other conveyance.

Hooks

Rule 14. No open hook shall be used with a bucket in hoisting. Safety hooks only shall be employed.

Crossheads

Rule 15. All shafts more than three hundred feet deep from which hoisting is done by means of a bucket must be provided with suitable guides, and in connection with the bucket there must be a cross head traveling upon these guides. The height of the cross head shall be at least two-thirds of its width. If the cross head be a type that is not secured to the hoisting rope, a stopper must be securely and rigidly fastened to the hoisting rope at least seven feet above the rim of the bucket.

Signals

Rule 16. Every shaft, if exceeding fifty feet in depth, shall be provided with an efficient means of interchanging distinct and definite signals between the top of the shaft and the lowest level and the various intermediate levels from which hoisting is being done. The signalling apparatus shall be a cord or wire actuating a knocker, bell or whistle, which may be supplemented by a speaking tube, or telephone, or an electrical system.

Rule 17. Special care must be taken to keep the signalling apparatus in good order.

Punishment for interference with signals

Rule 18. Any person who shall interfere with or impede any signalling in the mine within this State, or who shall knowingly damage any such signal system, or who shall knowingly give or cause to be given any wrong signal within the mine, or who shall ride upon any cage, skip or bucket at a time

when signals have been given informing the hoisting engineer that no person is so riding, shall be guilty of a violation of this Act, and shall be punished accordingly.

Signal codes

Rule 19. The following signals shall be used: One bell, hoist (when engine is at rest); one bell, stop (when engine is in motion); two bells, lower; three bells, men on cage about to ascend or descend; four bells, blasting signal. Upon receiving the blasting signal of four bells, the engineer must answer by raising the bucket a few feet and letting it back slowly, and then upon receiving the signal of one bell, he shall hoist the men from the blast.

Rule 20. Special signals in addition to the above may be used in any mine, provided they are easily distinguishable by their sound or otherwise from the foregoing code, and do not interfere with it in any way.

Rule 21. An easily legible copy of the above code, and of any special code adopted in any mine, shall be printed on a board or metal plate not less than eighteen inches by eighteen inches, and shall be securely posted in the engine room, at the collar of the shaft, and at each level or station. The superintendent of the mine shall be held responsible for the carrying out of this rule.

Timbering

Rule 22. The timbers in all manways in daily use shall be cleaned of all loose rock lodged upon them at least once in every twenty-four hours. Manways in daily use shall be kept clear of obstructions.

Fencing disused shafts

Rule 23. The mouth of every shaft or entry to a mine which, for the time being is out of use, or is used only as an air-way, and the approach to every open working other than ordinary prospecting trenches, and all elevated and exposed platforms and gangways, shall be kept securely fenced or otherwise protected.

Abandoned shafts

Rule 24. All abandoned shafts or other abandoned excavations shall be securely covered or fenced; *provided, however*, that in the case of abandoned open cuts fencing only shall be required.

Penalty for destroying fences and coverings

Rule 25. Any person who shall wilfully remove, injure or destroy all or any part of any coverings or fences provided for in Rules 23 and 24 of this Section shall be guilty of a violation of this Act and shall be punished accordingly.

Lighting

Rule 26. Stationary lights shall be provided during the working hours at all stations at vertical and inclined shafts during the time the same are in actual use; and also at all stations on the levels where hoisting or hauling is effected by means of machinery; and also at night at all working places on the surface, and at the head of any shafts not fenced or covered.

Rule 27. All places where hoisting, pumping or other machinery is erected, and in the proximity of which persons employed in the mines are working or moving about, shall be so lighted that the moving parts of such machinery can be clearly distinguished.

Manholes

Rule 28. In every mine in which mechanical haulage is employed there shall be at intervals of not more than one hundred yards, on each main haulage way, places of refuge, affording a space of at least two and one-half feet in width between the widest portion of the car or train running on the tramway and the side of the gallery.

Rule 29. Every manhole and place of refuge shall be kept constantly clear, and no refuse shall be placed therein, and no person shall in any way prevent access thereto.

Machinery and protection

Rule 30. All exposed machinery which when in motion would be dangerous to persons coming in contact therewith shall be securely guarded by a fence or railing. All electrical conductors shall be placed so as to protect any persons, so far as is possible, from coming into contact with the same.

Rule 31. No electrical current higher than two hundred and fifty volts shall be carried by any naked wire in any mine.

Protection against water

Rule 32. No raise shall be allowed to approach within ten feet of any portion of a winze, stope or other opening in which there is a dangerous accumulation of water, unless such winze or stope be first unwatered by bailing or pumping or by means of a bore from the raise.

Rule 33. When advancing a drift, adit level or incline toward a mine working that is suspected to be filled with water, a bore hole must be kept at least 20 feet in advance of the breast of the drive; and also if necessary in directions laterally from the course of the drive. Such a working place must not exceed six feet in width and such additional precautionary measures shall be taken as may be deemed necessary to obviate the danger of a sudden breaking through of water.

Rule 34. In every mine, where in the opinion of the inspector of mines, there is danger of a sudden inburst of water, such additional raises, drifts, or other workings shall be constructed as are necessary in the opinion of the inspector to ensure the escape of workmen from the lower workings.

Ladders and Ladderways

Rule 35. The space between the rungs of a ladder shall not exceed 12 inches.

Rule 36. The rungs of a ladder shall in no case be less than 3 inches from the wall of the shaft, or any opening in which it is used.

Rule 37. Every ladderway constructed and fixed in a vertical shaft more than 100 feet deep which may be used for the ascent and descent of persons working in the mine shall have substantial platforms at intervals of not more than 20 feet and the inclination of any ladder or section of a ladder shall not exceed 80 degrees from the horizontal.

Rule 38. All platforms except for an opening large enough to permit the passage of a man shall be closely covered.

Rule 39. Ladders shall project at least three feet above every platform in the ladderway and at least three feet above the collar of the shaft, unless hand rails are fixed at such places.

Rule 40. In ladderways not exceeding 100 feet in depth, ladders may be fixed vertically; over this depth no vertical ladders shall be used.

Rule 41. Under no circumstances shall any ladder inclining backward from the vertical be installed.

Rule 42. Ladderways shall be provided in all shafts in the course of sinking to within such a distance from the bottom thereof as will secure them from damage by blasting, but from the end of which ladderways chain or wooden extension ladders shall be extended to the bottom of the shaft.

Enforcement of Rules 35 to 42

Rule 43. It shall be the duty of the Superintendent to enforce the carrying out of Rules 35 to 42, and his failure so to do shall constitute a violation of this Act.

Passageway around shaft

Rule 44. All stations or levels shall have a passageway around or through the working shaft so that crossing over the hoisting compartment may be avoided.

Sumps

Rule 45. All sumps shall be securely planked over.

Stopes

Rule 46. In stopes timbered with square sets, the working floors shall be closely and securely lagged over. Lagging shall be long enough to reach clear across the caps.

Winzes or raises

Rule 47. Winzes or raises shall not be started in the direct line of a drift, but shall be offset from the drift.

Rule 48. The opening of such offset winze shall be protected by a fence or guard rail not less than three feet or more than four feet in height above the level of the drift.

Rule 49. Existing winzes opening directly from the floor of a drift or stope must be kept covered by a substantial hatch, or planking, except when in use, at which time passage to persons other than those working at the winze shall be barred off by a substantial rail across the roads of access to the openings.

Shaft stations

Rule 50. At all shaft stations a gate or a guard rail not less than three feet or more than four feet above the floor, must be provided and kept in place across the shaft, except when cage, skip or bucket is being loaded, but this prohibition shall not forbid the temporary removal of the gate or rail for the purpose of repairs or other operations, if proper precaution to prevent danger to persons be taken.

Top of shaft

Rule 51. The top of all shafts shall be protected by a gate so that persons or foreign objects cannot fall into the shaft.

Rule 52. If hoisting be done from greater depth than 100 feet, by means of a bucket, shaft doors must be constructed that will prevent any material from falling into the shaft while the bucket is being dumped.

Hoisting ropes

Rule 53. Every rope used for hoisting or lowering men or materials shall be securely fastened to its drum and when in use shall never be fully unwound, but at least one full turn shall remain on the drum.

Rule 54. The further end of the rope shall either be securely fastened within a tapered socket, or else it shall be bound around an oval thimble and then fastened to itself by not less than twelve clamps or bolts.

Rule 55. Every rope shall be treated with oil or some suitable rope compound at least once every month. Such compound must be chemically neutral, and must be of such consistency as to penetrate the strand and not merely cover the surface of the rope.

Explosives and Fuses

Rule 56. Every mine thawing in excess of a daily average of 100 pounds of dynamite shall be provided with a separate building for that purpose.

Rule 57. Dynamite shall not be thawed by any means other than a steam bath or a hot water device and such thawing device shall not be allowed to be come hotter than can be borne by the naked hand.

Rule 58. It shall be unlawful to thaw dynamite by placing it near a fire or steam boiler.

Rule 59. It shall be unlawful to thaw dynamite in a steam bath by using live steam.

Rule 60. It shall be unlawful for any person knowingly to distribute frozen dynamite to any person working in any mine.

Rule 61. No explosive shall be taken into any mine except in a securely covered case.

Rule 62. Detonators shall not be transported in the same vehicle or carried in the same case with dynamite or other exlposive.

Rule 63. No fuse shall be used in any mine that burns faster than one yard in eighty seconds or slower than one yard in one hundred seconds.

Rule 64. It shall be unlawful for any person to use within any mine any fuse unless the rate of burning be stamped by the manufacturer on the package containing such fuse.

Rule 65. Notice shall be posted at the entrance of every mine stating the rate of burning of the fuse used in such mine. The Superintendent shall be responsible for the carrying out of this rule.

General Rules

Rule 66. No person in a state of intoxication shall be allowed to enter or loiter about a mine.

Rule 67. All employees shall inform the mine foreman or his assistant of the unsafe condition of any working place.

Rule 68. Wages shall not be paid on any premises used for the sale of intoxicating liquors.

Rule 69. No intoxicating liquors shall be taken into a mine.

Rule 70. Strangers or visitors shall not be allowed underground in any mine unless accompanied by the operator or an official of the mine, or by an employee deputized by such operator or official to accompany them.

Rule 71. Every mine employing more than twenty-five men shall maintain a suitably equipped wash room which shall at all times be open to the employees of the mine.

Rule 72. Each workman employed in the mine when engaged shall have his attention directed by the mine foreman to the general and special rules provided for in this Act.

Rule 73. Any person who does any act wilfully in violation of any of the rules as prescribed in this Act shall be guilty of a misdemeanor.

SEC. 38. TWO OPENINGS TO SURFACE.—It shall be the duty of every operator of every mine within this State, excepting as hereinafter provided, to maintain at least two outlets to the surface from such mine; or an underground communicating passage way between every such mine and some other contiguous mine, so that there shall be at all times at least two distinct and available means of access to the surface to all persons employed in such mine or mines. Such outlets shall not be less than 50 feet apart and shall, if covered, be provided with separate and distinct and nonconnecting houses on the surface.

Where two openings to the surface shall not have been provided as aforesaid, it shall be the duty of the Inspector of Mines to order in writing, served upon the operator or superintendent of such mine, a second opening to be made without delay by the operator of said mine, and in the event of the operator of such mine failing forthwith to commence and prosecute the making of a second opening within twenty days after the service of said order, or in the event of the Inspector deeming any mine having but one such opening to be dangerous to the lives and health of those employed therein, it shall thereupon be the duty of such inspector forthwith to institute an action for an injunction to close said mine, provided for in Section 12 of this Act.

Provided, however, that Section 38 of this Act shall not apply in the case of (A) New workings being opened for the purpose of making a communication between two or more shafts, or to any working for the purpose of searching for or proving ore; (B) Or to any mine in which one of the shafts or outlets has temporarily become unavailable for the persons employed in the mine, and in which every effort is being made by the operator of the mine to open such temporarily unavailable outlet, and provided the same is not, in the opinion of the Inspector dangerous to the life and health of those employed therein; and (C) Mines having workings of less than 100 feet in depth.

SEC. 39. OPENINGS THROUGH CONTIGUOUS MINES. ALL COMMUNICATING OUTLETS BETWEEN CONTIGUOUS MINES SHALL BE ESTABLISHED BY AGREEMENT BETWEEN THE OWNERS THEREOF.—When communicating outlets have been established between contiguous mines, it shall be unlawful for the operator of either mine to close the same without the consent of both the contiguous operator or owner, and the Inspector of Mines.

Provided, however, that when such contiguous outlets have been established, each operator, unless it shall have been otherwise provided by agreement, shall pay a fair proportionate share of keeping such openings in such condition that men working in such contiguous mines may have access to the surface thereby.

Provided, further, that in the event of either operator desiring to abandon mining operations, the expense and duty of maintaining such communications shall devolve upon the party continuing operations and using the same.

In the event of failure or refusal on the part of one contiguous operator to keep such opening in safe condition, the other contiguous operator shall

have access thereto for the purpose of repairing and maintaining the same. When operators of contiguous mines have, by agreement, established underground communications between said mines as escapement outlets for the men employed in both, it shall be the duty of each operator to cause such communicating outlets in each operator's mine to be inspected at least once in every twenty-four hours; and it shall be the duty of each operator to see to it, within their respective mines, that the same are kept clear of every obstruction to travel and that intervening doors, if any, shall be kept unlocked and ready at all times for immediate use.

SEC. 40. PROVISIONS AFFECTING MINES HAVING BUT ONE OUTLET.—In every mine within this State, where under the provisions of Section 38 of this Act but one outlet is required, and where a single shaft affords the only means of ingress or egress to persons employed underground, such shaft if more than 200 feet deep shall be divided into at least two compartments. One of said compartments shall be set aside and used exclusively as a ladder way. Whenever such ladder way compartment shall be covered by a nonfireproof building, it shall be the duty of the operator of said mine to cause said ladder way to be securely bulkheaded at a point at least 25 feet below the collar of the shaft; and below this bulkhead, if the shaft is situated upon a side hill, a drift shall be driven to the surface; if the shaft containing said ladder way be otherwise situated this drift shall be driven on a level to a safe distance, but in no case less than 30 feet beyond the walls of the building covering the main shaft, and from such point a raise shall be made to the surface. The said raise shall be equipped with a ladder way, and it together with the drift connecting with the main shaft shall be kept in good repair and shall afford an easy exit in the event of fire. A failure on the part of the operator of said mine to carry out or cause to be carried out the provisions of this Section shall constitute a violation of this Act.

SEC. 41. OUTLETS NOT TO BE COVERED BY HOUSES.—It shall be unlawful for the operator of any mine within this State, after the passage of this Act, to erect any structure over the shaft or outlet of any mine, except head frames necessary for hoisting from such shaft or outlet, and the hatch or door necessary for closing such shaft or outlet.

Provided, however, it shall be lawful to erect a housing of non-inflammable and fireproof material over such shaft or adit to protect the men working at such point. In the case of existing houses covering the mouths of shafts or adits, it shall be the duty of the Superintendent of the mine to cause the immediate removal of all inflammable material stored therein, and it shall be the further duty of such Superintendent to prohibit the storage of any inflammable material within thirty feet from the exterior walls of any such existing house or within a like distance from the walls of any housing hereinafter built under the provisions of this Section. A failure on the part of any such superintendent to enforce the provisions of this Section relative to the storage of inflammable materials, shall be deemed a violation of this Act.

It shall be the duty of every operator to provide every adit, the mouth of which is covered by a house or building of any kind, with a door near the mouth of the adit, that can be closed from outside of the building by a pull wire or cable in the event of fire.

SEC. 42. LADDERWAYS AND LADDERS.—It shall be the duty of the operator of every mine to provide in addition to any mechanical means of ingress or egress, at least one means of outlet for the miners by means of ladders, from the lowest workings of the mine to the surface. All ladders and ladder ways, constructed after the passage of this Act, shall be built as prescribed in Rules 35 to 42 of Section 37 of this Act. All floors of setts in stopes and every shaft, winze, raise or incline steeper than 35 degrees from the horizontal through which men are obliged to pass, shall be provided with ladders and ladderways as specified in this Section.

SEC. 43. VENTILATION.—The operator of every mine, whether operated by shaft, stope or drift, shall provide and maintain for every such mine a good and sufficient amount of ventilation for such men and animals as may be employed therein, and shall cause an adequate amount of pure air to circulate through and into all the shafts, winzes, levels and all the working places of such mine.

SEC. 44. SANITATION. DRY CLOSETS.—It shall be the duty of the operator of every mine, for the purpose of improving the sanitation thereof, and preserving the health of those employed therein, to provide dry closets for the use of all men employed in such mines. At least one of such closets shall be placed on every level where an average of twenty-five or more men are employed, at any one time, and at least one such closet shall be provided for every twenty-five men employed within such mine. No dry closet shall be constructed without adequate provision for the effectual cleansing and removing of the contents thereof, which shall be removed and disposed of from time to time. It shall be the duty of the Mine Foreman to cause each dry closet to be supplied with some disinfectant or deodorizer to be sprinkled upon the contents thereof. It shall be the duty of all men employed within any mine where such closets are provided to use such closets exclusively when in the mine. Any operator of any mine who shall neglect or fail to provide closets, as required in this section, for use in any such mine, shall be deemed guilty of a violation of this Act.

SEC. 45. ROOF INSPECTION.—In all mines where stoping is done by the opening of chambers, the roof thereof being supported only by the walls of the chambers, or by pillars, it shall be the duty of the superintendent of the mine to detail a competent man to make a frequent inspection of the roof of those parts of the mine where men are employed, and said man so detailed shall be charged with the duty of dislodging any slabs of rocks in said roof which have become loose. While such dislodgment is being effected, the floor of the stope immediately beneath such loose rock shall be fenced off, or otherwise adequately guarded.

SEC. 46. SAFETY PILLARS.—It shall be the duty of the operator of every underground mine to leave standing on the inside of the boundary line of every mining property, safety pillars the width of which must not be less than 30 feet, measured at right angles from the said boundary line.

Provided, however, that on the application of either owner of adjoining mines, the Inspector may give permission in writing to either or both owners to weaken, cut through or work such pillars, if in the opinion of the

Inspector the same will not be dangerous to the lives of those employed within either of said mining properties. Such consent, or a copy thereof, shall be filed in the office of the Inspector. The failure of the operator of either or both of such adjoining mining properties to observe the provisions of this Section, shall be deemed a violation of this Act.

SEC. 47. INTOXICATING LIQUOR PROHIBITED IN MINES.—Whoever shall, while under the influence of intoxicating liquor, enter any mine, or any of the buildings connected with the operation of the same within this State, where miners or other workmen are employed, or whoever shall carry intoxicating liquors into the same, shall be deemed guilty of an offense against this Act, and upon conviction shall be punished accordingly.

Provided, however, nothing herein contained shall prevent the carrying of any alcoholic spirits or liquor into such mine or buildings for the purpose of administering to any one injured therein.

SEC. 48. PENALTIES.—Any wilful neglect, refusal or failure to perform the duties imposed and required to be performed by any section, clause, provision or rule of this Act, on the part of the parties or persons therein required to perform them, or the violation of any of the provisions or requirements thereof, shall be deemed a misdemeanor punishable by a fine not exceeding five hundred dollars, or by imprisonment for a period not exceeding six months, or both, at the discretion of the Court.

For any injury to person or property, occasioned by any wilful violation of this Act, or wilful failure to comply with any of its provisions, by any owner, operator or superintendent of any metalliferous mine or quarry within this State, employing at least ten men, a right of action shall accrue to the party injured, for any direct damages sustained thereby, against said owner or operator, and in case of loss of life by reason of such wilful violation and wilful failure, as aforesaid, a right of action shall accrue to the widow and lineal heirs or adopted children of the person so killed, for a like recovery for damages for injury sustained by reason of such loss of life, not to exceed the sum of Five Thousand Dollars. Provided that all suits brought under this section shall be commenced within one year from the time any cause of action shall have accrued under this section, and not afterward.

SEC. 49. COPY OF ACT TO BE POSTED.—It shall be the duty of the superintendent of every mine within the provisions of this Act to post or cause to be posted, at all times, in the office of said mine, and on a building or board in some conspicuous place at each entrance to the mine, a printed copy of this Act.

Any person who wilfully removes, injures or defaces any such printed copy, when so posted, shall be guilty of a violation of this Act.

SEC. 50. REPEAL OF INCONSISTENT LAWS.—All laws or parts of laws inconsistent with the provisions of this Act are hereby repealed.

SEC. 51. ACT TO TAKE EFFECT.—This Act shall take effect on the ———day of ————, 19 .

(N.B. At least ninety days after the passage of the Act, so as to prepare the miner and operator to the changed conditions.)

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